ENGINEERING NEWS-RECORD

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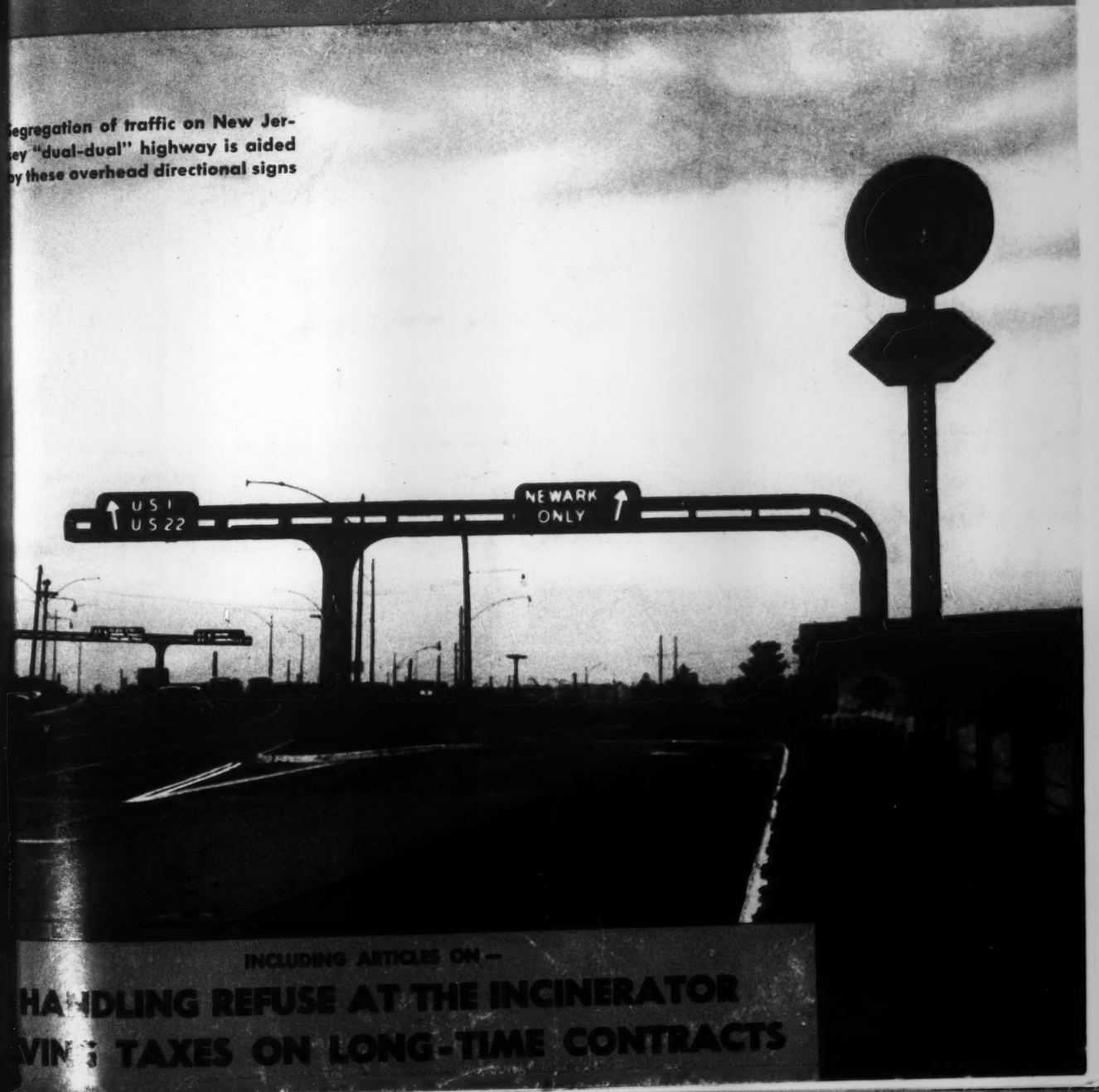
JANUARY 8, 1948



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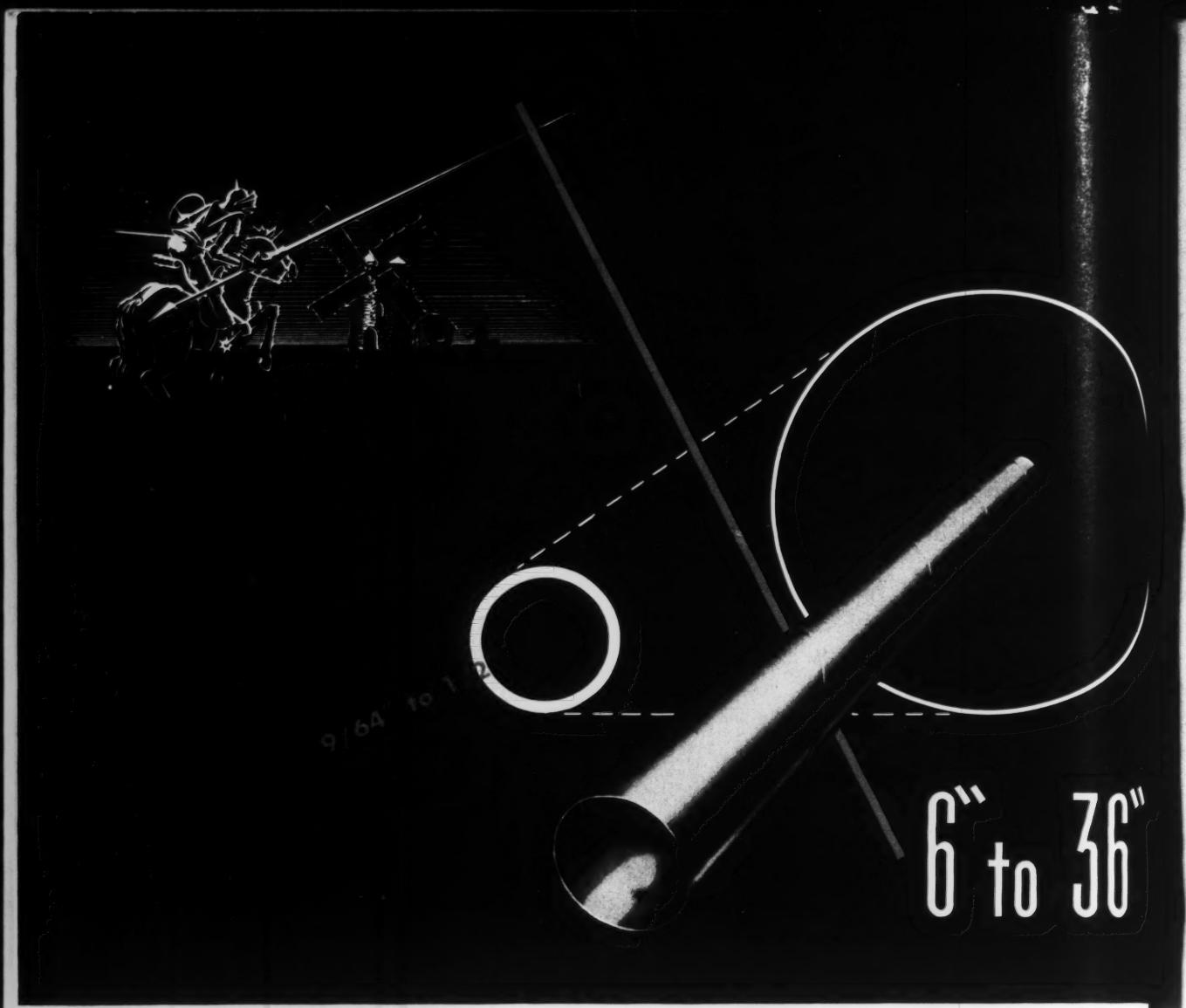

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ENGINEERING NEWS-RECORD

Volume 140 • Number 2

January 8, 1948

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Shall I use load tests?

MORE and more engineers are recognizing the value of test piles and pile load tests. These tests afford the maximum assurance of foundation security and economy. There are three periods during which load tests are utilized:

1. **PRE-DESIGN LOAD TESTS** — Various types of piles are driven in sample areas of the site. The piles are then test-loaded and checked for settlement. In this way the type of foundation best suited to the conditions can be ascertained.

2. **PRE-CONSTRUCTION LOAD TESTS** — It is essential that these tests be made early in the job. The first step is to plot out the areas in the site in which the sub-soil characteristics are similar (as determined by soil borings). Then, one or more piles are driven and test-loaded before actual driving operations are started in each of these areas. Since the test loads usually exceed the loads the piles will actually have to carry by 150%-200%, the safety factor is established.

3. **POST-CONSTRUCTION LOAD TESTS**—Frequently load tests are made after work on the superstructure has started. It is advisable to point out the danger of this method. In the event that a load test proves unsatisfactory, it is too late to redesign the completed portion of the foundation. The great expense of rectifying such an error can be avoided through use of either of the above two methods.

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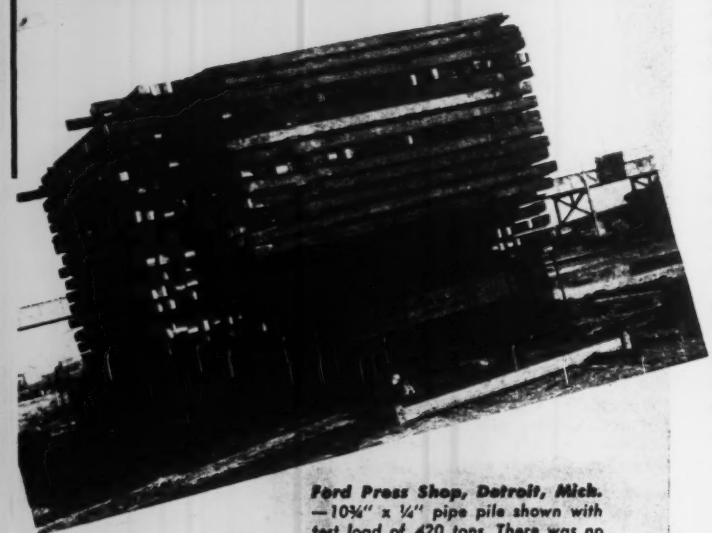

Ford Press Shop, Detroit, Mich. *—10¾" x ¼" pipe pile shown with test load of 420 tons. There was no sign of failure.*

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W

Construction Trends

Source and Distribution of Construction Money

Of the total volume of heavy engineering construction contracts awarded in 1947, $3,167,801,000 went for private construction projects, or 57 percent. The remaining $2,491,431,000, or 43 percent, went for federal and state and municipal projects. The total contract volume of $5,659,232,000 for 1947 is the third highest on record, as reported by *Engineering News-Record*, exceeding the 1946 total of $5,176,034,000 by 9 percent. In 1946, 61 percent of the total contracts awarded was accounted for by private construction jobs and 39 percent by public construction.

During the 15-year period just prior to 1946, beginning with 1931, public construction contracts accounted for over 50 percent of the total construction volume recorded each year. In 1934, 82 percent of the annual total went for public construction projects, in the pre-war year of 1939, 70 percent and in 1942, the war building era and peak year for construction activity, 94 per cent of the total went for public construction.

A segregation of the 1947 construction contract volume according to territorial distribution shows the Middle Atlantic states recording a $1,536,595,000-volume, or 26 percent of the annual total. West of the Mississippi accounted for $1,335,314,000, or 24 percent of the total; South, for $978,582,000, or 17 percent; Far West, for $846,098,000, or 15 percent; Middle West, for $758,631,000, or 14 percent, and New England, for $204,012,000, or 4 percent.

In the peak war building era of 1942, the section West of the Mississippi accounted for 26 percent of the annual total; the South, for 21 percent; the Far West and Middle West, for 17 percent each; the Middle Atlantic, for 13 percent and New England, for 5 percent. In the pre-war year of 1939, however, as in 1947, the Middle Atlantic states recorded the largest contract volume, 33 percent of the annual total, with West of the Mississippi recording the second largest volume, or 18 percent of the total.

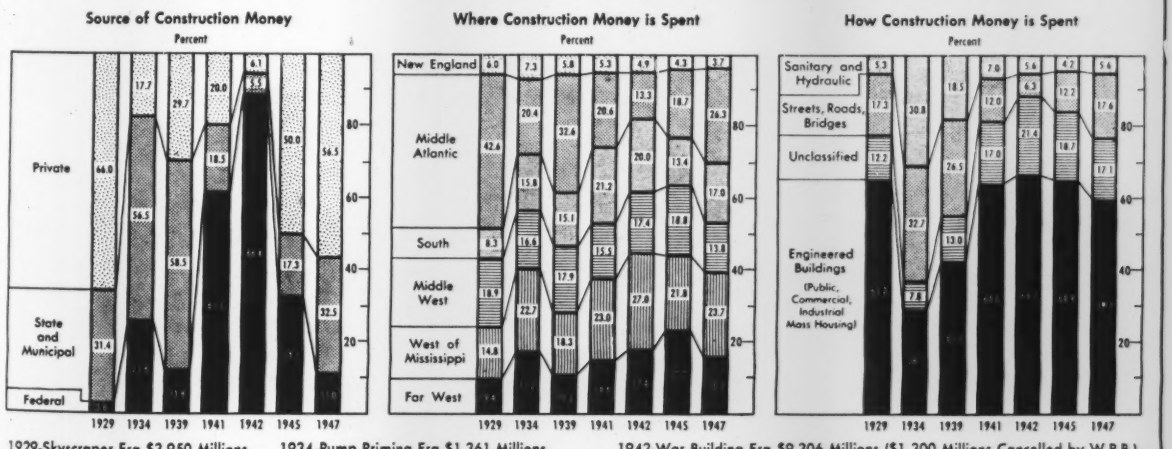
Among the several groups of classified construction, engineered buildings which includes public, commercial and industrial buildings and mass housing, accounted for nearly 60 percent of the total volume of contract awards in 1947. Building contracts awarded amounted to $3,375,658,000, 0.1 percent above the 1946 total and the third highest volume on record, exceeded only in 1941 and 1942.

In the peak construction year of 1942, 67 percent of the annual total went for engineered buildings; in 1939, 42 percent; in 1934, 29 percent and in the predepression year of 1929, 65 percent.

In other classes of construction activity, streets, roads and bridges recorded a total of $909,430,000, or 18 percent of the annual volume in 1947; sanitary and hydraulics, $313,905,000, or 6 percent; and unclassified construction, $979,239,000, or 17 percent.

In 1942, contracts awarded for streets, roads and bridges accounted for only 6 percent of the annual total. In the prewar year of 1939, however, they accounted for 26 percent of the total and in 1934, for 33 percent. Sanitary and hydraulic construction in 1942 accounted for 6 percent of the total volume recorded. In 1939, it accounted for 19 percent of the annual volume and in 1934, for 31 percent.

CHANGES IN CHARACTER OF CONSTRUCTION ACTIVITY



1929-Skyscraper Era $3,950 Millions, 1934-Pump Priming Era $1,361 Millions, 1942-War Building Era $9,306 Millions ($1,300 Millions Cancelled by W.P.B.),
1939-Pre-Defense Era $3,003 Millions, 1941-Defense Building Era $5,869 Millions, 1945-War's End, Reconversion Started, $2,289 Millions, 1947-$5,659 Millions

ENR Business News

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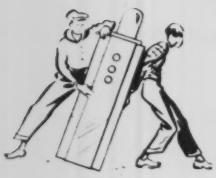

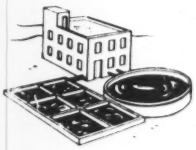

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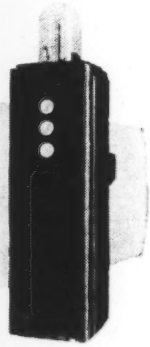

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S-15

New Construction Volume in December

Civil engineering construction volume in continental United States totals $503,384,000 for December, an average of $125,846,000 for each of the four weeks of the month. This average is 6 percent above the average for November, and 43 percent above the average for December, 1946, according to *Engineering News-Record*.

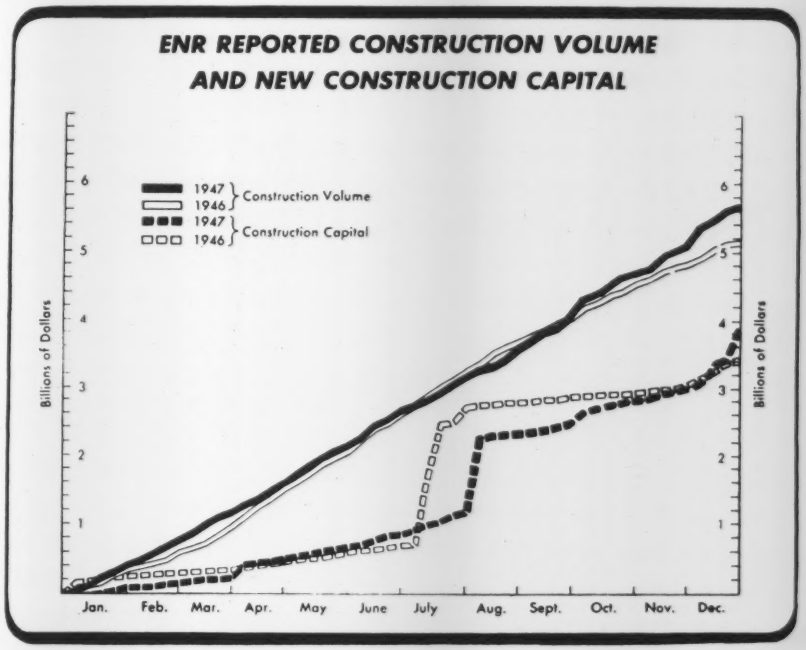
Private construction for December on a weekly average basis is 21 percent above last month, and 11 percent above December, 1946. Public construction is 8 percent below last month, but 117 percent above last December. State and municipal construction is 29 percent below last month, but 50 percent above the average for December, 1946. Federal construction, up 89 percent from last month, is 748 percent above December, 1946.

Weekly averages in the various classes of construction for December, 1947 compared with November, 1947 show gains in earthwork and drainage, of 72 percent; public bridges, 66 percent; commercial buildings, 58 percent; public buildings, 13 percent; and highways, 3 percent. Losses are recorded for public unclassified, 19 percent; private unclassified, 28 percent; industrial buildings, 31 percent; waterworks, 60 percent, and sewerage, 72 percent.

Geographically, four sections showed gains in December, 1947 over November—Middle Atlantic, 44 percent; New England, 24 percent; South, 22 percent; and West of the Mississippi, 9 percent. Middle West dropped 35 percent; and Far West, 38 percent.

Five sections made gains in December over December, 1946—Middle Atlantic, 122 percent; West of the Mississippi, 57 percent; Far West, 56 percent; Middle West, 9 percent; and New England, 9 percent. South dropped 11 percent from 1946.

New capital for construction for the four weeks of December, 1947 totals $781,493,000, or a weekly average of $195,373,000 for the month. The weekly average is thus 201 percent above the weekly average of $64,924,000 for November, 1947 and 148 percent above the weekly average of $78,640,000 for December, 1946.

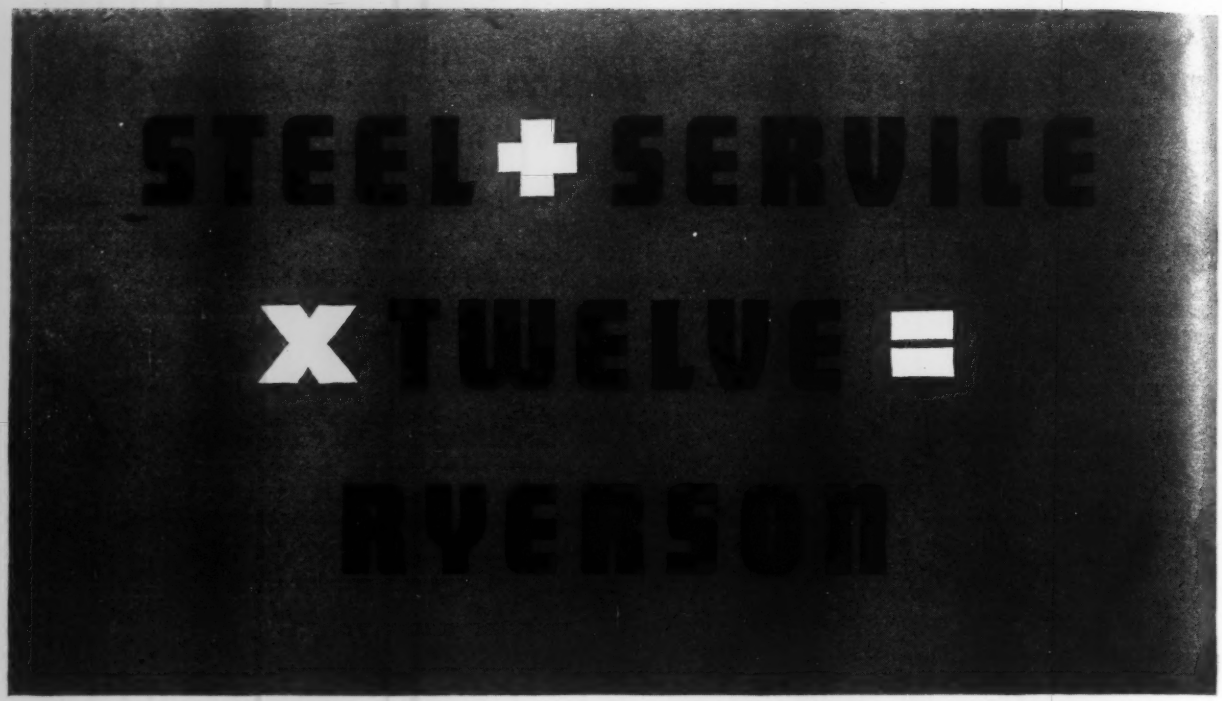


ENGINEERING CONSTRUCTION CONTRACTS REPORTED TO ENGINEERING NEWS-RECORD — DECEMBER, 1947

Engineering News-Record *reports continental U. S. Construction projects of the following minimum costs—Waterworks, excavation, drainage and irrigation,* $28,000; *other public works* $50,000; *industrial buildings,* $68,000; *other buildings,* $250,000

Four Weeks—Thousands of Dollars (000 Omitted)

	New England	Middle Atlantic	South	Mid West	West of Mississippi	Far West	United States December 1947	United States Twelve Months 1947	United States Twelve Months 1946	Canada
Public Works										
Waterworks	204	788	911	6,563	3,669	1,013	13,148	139,141	109,159	238
Sewerage	.....	3,637	1,106	901	4,178	2,980	12,802	174,764	113,589	380
Bridges, public	270	13,091	3,451	1,175	3,177	300	21,464	195,223	126,579	245
Earthwork and waterways	.....	447	34,499	127	12,566	1,189	48,828	326,856	327,605	.....
Streets and roads	1,508	10,444	13,052	11,444	12,907	5,898	55,253	794,133	769,387	325
Buildings, public	3,762	22,929	5,222	4,750	16,019	11,160	63,842	615,492	414,087	4,589
Unclassified, public	862	3,157	2,251	686	5,061	3,663	15,680	245,822	157,957	1,229
Total public	**6,606**	**54,493**	**60,492**	**25,646**	**57,577**	**26,203**	**231,017**	**2,491,431**	**2,018,363**	**7,006**
Federal government (included in above classifications)	918	14,515	38,928	810	23,221	8,278	86,670	656,419	499,271	.....
Private										
Bridges, private	.....	.....	.....	250	.....	.....	250	1,074	2,092	.....
Industrial buildings	820	4,622	10,668	1,914	15,562	11,092	44,678	862,205	1,113,251	4,847
Commercial buildings	6,418	121,825	25,624	18,409	26,688	8,374	207,338	1,897,961	1,846,173	4,400
Unclassified, private	.....	638	2,676	3,234	12,536	1,017	20,101	406,561	196,155	114
Total private	**7,238**	**127,085**	**38,968**	**23,807**	**54,786**	**20,483**	**272,367**	**3,167,801**	**3,157,671**	**9,361**
Total Engineering Construction:										
December, 1947—4 weeks	**13,844**	**181,578**	**99,460**	**49,453**	**112,363**	**46,686**	**503,384**	.....	.....	**16,367**
November, 1947—4 weeks	11,172	126,062	81,547	76,456	103,303	75,817	474,357	.....	.....	48,090
December, 1946—4 weeks	12,697	81,824	111,365	45,280	71,690	29,999	352,855	.....	.....	21,791
Twelve Months—1947	**204,012**	**1,536,595**	**978,582**	**758,631**	**1,335,314**	**846,098**	.....	**5,659,232**	.....	**446,679**
Twelve Months—1946	292,508	1,228,326	864,146	632,825	1,041,363	1,116,866	.....	.....	5,176,034	310,101



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News of the Week

ENGINEERING NEWS-RECORD • JANUARY 8, 1948 • VOLUME 140 • NUMBER 2

New York builders, AFL OK wage stabilization pact

Agreement covering majority of city's construction men grants some increases, freezes most wages for 18-months —Important unions not yet in accord

In the second agreement along the same lines within a year, New York City building construction employers and a majority of construction labor unions last week reached agreement to stabilize wages in the city and adjoining New York State counties.

The agreement was reached after weeks of negotiation, and was signed by the Building Trades Employers Association and the Construction Trades Council of Greater New York (AFL), which said that about 70 percent of the city's 250,000 construction workers were represented by signatories.

In brief, the agreement permits some wage rises—averaging about five percent—and freezes other wages at present levels until July 1, 1949. At that time, wages may be increased, but only if the cost of living has risen more than 15 percent in that period. In addition, employers and unions are to cooperate in supervising an apprentice system to insure adequate flow of new men into the trades, "with due regard for keeping the number of journeymen proportionate to the demand for their services."

The agreement covers 27 of the 38 unions that form the Building Trades council, and omissions from the initial agreement include such important unions as the electrical workers, with 22,000 members; bricklayers, with 6,500 members; painters, with 10,000 members, and cement and concrete workers, 10,000 members.

This new pact is the second step within a year to stabilize construction costs in the metropolitan area, as builders became concerned over the detrimental business effects of continually rising construction costs. The first agreement, reached last July (*ENR* July 3, 1947, vol. p. 1) stabilized wages in the heavy construction trades for a two and one-half year period without wage increases even if other labor groups succeeded in obtaining them.

Mayor demands action

The new negotiations leading to last week's announcement resulted from a demand by Mayor William O'Dwyer that some action be taken to stabilize costs. Last July, the Mayor reported that New York City alone has projects afoot estimated to cost more than $1,250,000,000 but cannot get them under way or plan for them because of the instability of costs. He said that contractors were forced to "pad" their bids to protect themselves against runaway costs, and called on labor and contractors to help in reducing that risk.

According to a joint announcement by Howard McSpedon, president of the Building Trades Council and F. J. Driscoll, chairman of the employers' group, the agreement grants wage increase of 25 cents an hour for carpenters, elevator constructors, cement masons, glaziers, hoisting engineers, marble polishers, helpers, riggers and derrickmen, ornamental iron workers and stone setters. This would set a wage range for the affected crafts at from $1.90 for some helpers to $3.00 an hour for hoisting engineers and some other journeymen.

Should the Bureau of Labor Statistics Cost of Living Index show an increase of more than 15 percent in April, 1949, over January, 1948, the rates agreed upon will be increased by half the excess over 15 percent.

No changes in working hours were approved, excepting for derrickmen and stone riggers, who were cut from eight to seven hours while their wages went up from $2.15 to $2.50 per hour. The agreement imposed no ban on overtime work.

CAA favors $13 million airport work

During the past few months the Civil Aeronautics Administration has approved 130 grants totalling $13,259,237 to local sponsors of airport improvement projects in accordance with the $1 billion Civilian Airport Improvement Program authorized by Congress in 1946 (*ENR* May 16, 1946, vol. p. 763). Local matching funds total slightly more than this amount.

Grant offers for work at smaller airports were most numerous. Those for Class 1 fields total 35, with a combined federal grant of $1,774,853, and those for Class 2 fields total 37 grants, calling for $1,666,481 in federal funds. Approvals for Class 3 airports number 52, with federal aid for this work totalling $8,041,268. Six projects at class 4 and terminal-type fields, with $1,766,638 of federal aid have been approved.

The airport act of 1946 authorized an appropriation of $500,000,000 of federal aid to be matched by state or local sponsors on a 50-50 basis for Class 1, 2 and 3 fields, but with less than 50 percent of federal aid to be provided for projects on bigger fields. Federal contribution for any one year was limited to $100,000,000.

The first grant under the act was made on May 7 for construction at Twin Falls, Idaho of a class 3 airport at a total cost of $647,000. For the first few weeks after that date, few approvals were made, but late in 1947 the processing rate began to show an increase.

In August, CAA announced a revised program calling for a total expenditure of $136,804,685 at 908 locations, of which the federal government was to supply over $66,000,000 and the states and local groups above $70,000,000 (*ENR* Aug. 28, 1947, vol. p. 285). Federal funds were to be provided from $45,000,000 Congress appropriated for the 1947 fiscal year and $32,500,000 for the present fiscal year. It is this revised program that is now moving ahead rapidly.

NEWS IN BRIEF

In telegraphic form, here are latest news developments on the engineering and construction front during the week.

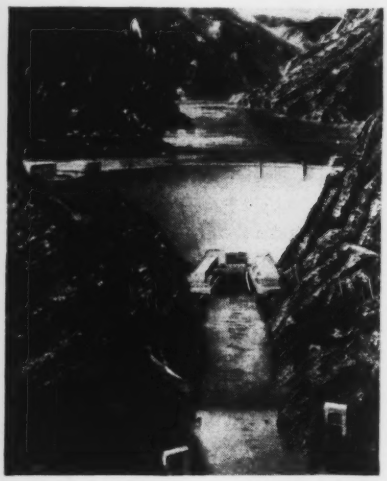
Construction—A $1,000,000 concrete and steel office building will be built at *San Angelo, Tex.* . . . Work is to start soon on a $1,716,000 Masonic temple at *Waco, Tex.* . . . *San Diego, Calif.* county school superintendents office has asked the state for $6,000,000 aid for school construction . . . New hospitals are planned for *Columbia* and *Newton, Miss.* . . . About $2,000,000 will be spent in two years for buildings at the Texas State University for Negroes at *Houston* . . . Excavation is being completed for a $15,000,000 plant of the Columbia Cellulose Co. Ltd. at *Port Edward, B. C.* . . . A $1,500,000 tuberculosis unit is to be built at *Beverly Hills* Sanitarium, *Knoxville, Tenn.* . . . *Edmonton, Alta.*, has a 1948 public works program of $13,000,000 . . . Columbus and Southern Ohio Electric Co. has started a $15,000,000 generating station near *Athens, Ohio* . . . *Galveston, Tex.*, has voted $1,760,000 bonds for municipal improvements . . . Several million dollars will be spent by the Pennsylvania Electric Co. to modernize its plant at *Erie, Pa.* . . . *Bogalusa, La.*, taxpayers will soon get a proposal for a $1,000,000 bond issue to cover extension of sewerage and other facilities . . . *Columbus, Miss.*, has approved issuance of $650,000 in bonds for extension and improvement of the city waterworks system . . . *Quincy, Fla.*, has approved a $200,000 bond issue for water system improvements . . . Bids are soon to be received by the Louisiana State Department of Institutions for a new $1,000,000 receiving station and hospital building for the state penitentiary at *Angola* . . . The newly organized Oberlin Co-operative Rice Drier, Inc., *Oakdale, La.*, plans construction of a $100,000 rice drier and storage plant near *Oberlin*.

Housing—M. A. C. Bldg. Corp. has launched a $1,300,000 home building project at *Grand Prairie, Tex.* . . . Fred Trump has assembled a 50-acre plot on the Belt Parkway in Brooklyn and Queens, *N. Y. City*, as the site of a 2,000-unit housing project . . . Work has started on the $1,000,000 Mount Vernon apartments at *Omaha, Neb.*,—13 buildings with 114 units . . . The New York Life Insurance Co. has plans for an apartment building and garden development for approximately 600 families, to occupy the block between Second and Third Avenues and 65th and 66th Streets, the former site of the Third Avenue Railway Company's carbarn in *N. Y. City*. . . The building will be 19 stories high with 2,350 rooms . . . The land commission of *Milwaukee, Wis.*, has approved a low rental apartment building project proposed by the Milwaukee Urban Redevelopment Corp. The proposal calls for an 11-story, 139 unit building in the block bounded by N. 10th, N. 11th, W. Michigan and W. Claybourn streets. It is planned as the first in a series of four. In the same city Sam Taxman announced that he hopes to provide 1,000 rental housing units on a 43-acre tract in the towns of *Granville* and *Wauwatosa, Wis.*

State housing authority urged in Massachusetts

A bill has been filed in the Massachusetts General Assembly which would set up a State Housing Authority empowered to borrow up to $200,000,000 for the construction of low-rental housing units. Sponsors estimate the bill would provide 36,000 new homes.

Members of the authority would be appointed by the governor and would have the power to seize property by the right of eminent domain for home construction, and to grant tax exemptions and encourage the low rental plan.



Highest Dam — Bureau of Reclamation engineers are now investigating the feasibility of the proposed Hells Canyon Dam on the Snake River where it forms the Oregon-Idaho border. If built, the dam would be the world's highest, rising 742 ft. above the stream bed as a concrete-gravity structure. Crest length would be 1,740 ft. and the dam would store some 4,500,000 ac. ft. of water in a 100-mi. reservoir.

No satisfactory bid yet on Tacoma bridge bonds

Although Pierce County has offered to underwrite the proposed $14,000,000 bond issue to the extent of $1,500,000, the Washington State Toll Bridge Authority has been unable to obtain a satisfactory bid for bonds to finance reconstruction of the Tacoma Narrows suspension bridge (*ENR* Dec. 18, 1947, vol. p. 835).

W. C. Allen, Inc., of Chicago is reported to be interested in the bonds but only on the condition that it be granted an option on the right to buy the bonds when the current 90-day extension expires. The firm was granted this extension early in December when it reported it was unable to submit a bid at the scheduled opening but might be able to do so if granted an additional 90 days.

The state has indicated it could not accept this proposal. When the extension expires, early in March, the state is expected again to advertise for bond bids, including the Pierce County offer in the terms.

A. E. Johnson appointed Arkansas road engineer

A. E. Johnson has been appointed chief engineer of the Arkansas Highway Department, to succeed the late W. W. Zass (*ENR* Dec. 25, 1947, vol. p. 857).

Mr. Johnson, who majored in engineering at the University of Arkansas, had been chief assistant to Mr. Zass for several years and before that was resident engineer for the department at Harrison. He is vice-president of the Southeastern Association of State Highway Officials.

W. G. Scott resigns as Nebraska roads chief

Wardner G. Scott, head of the Nebraska State Department of Roads and Irrigation, since January, 1941, will leave that post next Feb. 1 to be succeeded by Fred H. Klietsch, now chief highway engineer.

Mr. Scott will become vice-president and chief engineer of the W. A. Lynn Construction Co. and associated companies engaged in construction work for the Army Engineers on the Missouri River.

Mr. Klietsch is an engineering graduate of the University of Nebraska. He will be succeeded by R. F. Weller, who joined the department in 1927.

Fleming sees $75 billion public works needed by states in "next few years"

Federal Works Agency report warns of shortage of prepared plans, urges renewal of state and local planning programs

Warning that the demand for new public facilities is running far ahead of prepared plans, Maj. Gen. Philip B. Fleming last week told President Truman that the United States would need some $75,000,000,000 of state-sponsored public works over "the next few years."

In a report to the President on the status of public works, General Fleming, Administrator of the Federal Works Agency, said that a sudden business recession might suddenly call for such public works, and would find the states inadequately equipped with plans ready for use. Calling attention to what he called "the huge accumulation" of requirements for hospitals, highways, schools, airports, water and sewerage systems and similar facilities, his report was seen as implying that federal funds should be supplied to provide money for planning the improvements.

The postwar advance planning program—responsible for a large amount of planning already completed—expired last June 30. Several measures now pending in Congress are aimed at restoring the program.

Plans inadequate

Contrasting the estimated demand with plans already prepared, the report said that as of June 30, 1947, specific state and local projects blueprinted, ready for activation or in some stage of planning, totalled $19,900,000,000. As of the same date, such projects completed amounted to $2,400,000,000.

"Even if the $75,000,000,000 demand were spread over a 15-year period," General Fleming reported, "it would require construction at the rate of $5,000,000,000 a year—almost two and a half times the 1947 rate of state-local construction.

"Quite apart from the possible need for public works to stabilize the construction cycle and the business cycle, we need more advance planning to assure an orderly flow of public construction in prosperous times like the present. Today, the effective shelf of plans is equivalent to a little more than one year's work at the 1947 inception rate. If public works expand because of the pressure of needs, our shelf may well be depleted.

"If a downswing in the business cycle should call for broad expansion of public construction, we simply would not have the necessary volume of public works planned well in advance.

"In any event, the . . . . needs of our communities are clearly established. They are fundamentally human needs, but they also include unsolved problems of business and industry. Only a sound, forward-looking construction policy can help us meet these needs in the order of their urgency."

Award first contract on $27 million Mystic Bridge

The award of the first construction contract to start work on the $27,000,000 Mystic River toll bridge near Boston, Mass., was announced last week by the Mystic River Bridge Authority.

The contract, for construction of two piers to support a span over the Little Mystic channel between Charlestown and the Boston & Maine Railroad freight yards, was given to V. Barletta Company of Roslindale, for a low bid of $269,870. The bid was 20 percent below original estimates by engineers for the Mystic River Bridge Authority.

Planned to end at least one of Boston's traffic bottlenecks, and to provide a north-south route through Boston, the bridge, scheduled for completion in 1950, will be the largest ever built in New England.

Its main span will be a suspended structure, 135 ft. above water level, to clear heavy river traffic.

Seek $250 million for Penna. hospitals

The Pennsylvania Advisory Hospital Council said in a recent report that it would require $250,000,000 to meet the state's current and future general hospital needs.

Under a federal law, Pennsylvania will get $4,500,000 annually for five years to increase hospital facilities, provided the U. S. Surgeon-General approves the plan.

No money is availabe now, but if Congress passes an appropriation, allotments will be made to institutions on a matching basis—that is, they will spend $1 for every $1 of federal money given to them.

Governor James H. Duff, has approved nearly $11,000,000 more for mental hospital construction to bring to $66,000,000 the state funds allocated for institutional expansion since 1943.

Press Assns. photo

***White Christmas**—New York City residents awoke the day after Christmas to a scene unprecedented in the city's history—a 25.8-in. snowfall had blanketed the community in 24 hours with what Weather Bureau experts estimated was 99,000,000 tons of snow. City officials threw a force of more than 31,000 workers and 6,000 vehicles of all types into a $6,000,000 battle to clear the streets and restore disrupted communications. Scene above, on famed Times Square, was duplicated throughout the city and through much of the northeast as heavy snowfalls hit New York and New England.*

Mark D. Hollis named Asst. Surgeon General

Adm. J. K. Hoskins retires after 34 years sanitary engineering work

Mark Dexter Hollis, 39, a civil engineer, has been appointed Assistant Surgeon General, U. S. Public Health Service of the Federal Security Agency, effective Jan. 1, Surgeon General Thomas Parran has announced.

Mr. Hollis, a career man in the service, will head engineering activities of Public Health Service, replacing John K. Hoskins, who is retiring after 34 years in sanitary work.

After being graduated as a civil engineer from the University of Georgia in 1931, Hollis was employed for a year on construction in Georgia and South Carolina. From June, 1932, to August, 1934, he served with the PHS on special assignments in Washington and in the field.

He was assigned to the Chesapeake Bay pollution survey at Norfolk, Va., in March, 1934, and served in the office, laboratory and field sections of investi-

J. K. HOSKINS

M. D. HOLLIS

gation. In July, 1934, he was transferred to the National Inttitute of Health, where he had administrative duties in connection with typhus fever work. From August, 1934, to February, 1939, he was director of the division of engineering for the North Dakota State health department.

In February, 1939, the new director re-entered the PHS as assistant, and later as associate, public health engineer, and was assigned to the Office of Stream Sanitation, Cincinnati, Ohio.

Malaria control work

During the war, Hollis was assigned to malaria control work in defense areas, and in 1946 he became officer in charge of the communicable disease center at Atlanta, Ga., where he developed programs for the control of malaria, typhus and other diseases spread by zoological vectors. In January, 1947, he returned to Washington as an executive officer in the office of the Surgeon General.

Mr. Hoskins is retiring after a long career. He directed the malaria control operations in extra-cantonment zones of military installations in Alabama and Georgia in 1917-1919, and later undertook research and survey studies on pollution in the Ohio, Illinois, and upper Mississippi rivers, Chicago Drainage Canal, and Lake Michigan. In 1940, he was placed in charge of the sanitation section, division of Domestic Quarantine. After being commissioned sanitary engineer in the regular corps of the PHS in 1930, Hoskins became Assistant Surgeon General (sanitary engineering) in 1943. He is a graduate of Pennsylvania State College where he received an advanced degree in civil engineering in 1910. He once spent two years studying water treatment and sewage disposal methods in principal European cities and took extended engineering courses at the University of Berlin, Germany.

PERSPECTIVE . . . .

Taft-Hartley problems

After almost seven months under the Taft-Hartley law, the construction industry is still in the dark on at least two questions: What will be done about jurisdictional disputes, and how will the closed shop problem be handled.

The law is quite clear as to the role of the National Labor Relations Board. NLRB must decide a jurisdictional dispute if it is not settled—or a method of settlement reached—within 10 days after the board receives a complaint of an unfair labor practice under paragraph 4 (d) of section 8 (b). This paragraph makes it an unfair practice for a union to force an employer to assign work to a particular union or craft.

What is not clear is how the contractors and the unions will handle this issue. The Associated General Contractors and the AFL Building Trades Department have had some discussions, between themselves and with NLRB General Counsel Robert N. Denham on setting up machinery for resolving jurisdictional disputes without sending them to NLRB. The proposal under serious consideration would provide for panels of labor and management with an impartial chairman. (*ENR* Dec. 18, 1947, vol. p. 839.)

More serious, however, is the question of the closed shop. There are two parts to this problem—the possible disruptive impact of the closed-shop ban on labor relations in the construction industry, and how to apply the Taft-Hartley union-shop regulations.

The closed shop has been considered sacred by the AFL building trades unions. What will happen when present closed-shop contracts expire, as many of them will in the spring? Will the industry face closed-shop strikes such as the printers have pulled against the Chicago and other newspapers?

Congress has no intention, however, of changing the Taft-Hartley law this year. Unless they make "bootleg" closed-shop agreements with employers, involving considerable risks for both sides, the unions will have to be content with a union shop. A union shop permits an employer to hire whom he pleases, the new worker joining the union after 30 days.

This raises the other part of the problem. The law says that an employer may not sign a union-shop contract unless a majority of the employees who would be affected have voted to authorize the union to make such a contract. How can this be done in an industry where many contractors do not have employees of their own, but instead hire them from day to day, as they are needed, through union halls? What would be the bargaining unit?

One proposal which seems to stand the best chances of becoming official NLRB procedure would work like this:

The bargaining unit would consist of workers in a particular craft who worked a specified amount of time during the preceding year for any of the construction contractors in the area designated by NLRB.

In areas where there is a contractors association which bargains with the union, NLRB would designate employees of member contractors as the bargaining unit for each craft. Where there is no association of this type, NLRB would have to group the employers for this purpose.

Names of the workers and the number of days worked for each contractor would be obtained from payroll records. All eligible employees in the area would then vote in the union-shop poll.

This same procedure may also be used on the question of union representation or union decertification.

States announce plans for new-year highway construction, repair projects

Most 1948 programs include secondary road improvements, widening of main arteries—Bridges and super-roads listed

As 1947 ended, most state highway departments began to prepare for an early start when the 1948-construction season opens, in order to catch up with their huge backlogs of essential repair and new construction.

Among reports released last week were:

New York—The state has proposed a $20,600,000 network of broad highways for the area around Binghamton, to radically alter the traffic patterns of Binghamton, Johnson City and Endicott, and provide for five new bridges—three over the Susquehanna River and two over the Chenango. Plans provide for two east-west highways through the Triple Cities area and one north-south highway in Binghamton and the towns of Dickinson and Fenton.

State and federal funds would be used to pay for $19,393,745 of the cost.

Texas—The highway department will spend $6,330,000 rebuilding 1,456 miles of roads. The work will be done without federal aid, and is scheduled to be completed by next summer. It involves 169 projects, mostly with asphalt surfacing.

Iowa—The highway commission has announced that it will begin next spring widening 18-ft. paving on its primary road system to 22 ft. The state still has 4,200 miles of 18-ft. paving.

West Virginia—The road commission established an all-time record last year when it awarded 135 contracts totalling $12,387,959 for primary and secondary roads. The 1947 contracts were exclusive of many projects undertaken by state forces and the commission's prison labor division. Of the more than $12,000,000 awarded to contractors, $8,966,348 was spent on the primary system, and $1,417,380 on secondary highways, while bituminous surfacing awards totalled $2,004,231 for the year.

Utah—The highway engineering staff has been instructed to give first priority to completion of plans for a 4-lane highway on a section of U.S. 91 between Salt Lake City and Ogden, dubbed Utah's "Death Highway" because of an unprecedented number of fatal accidents—29—on it last year.

Roy W. McLeese, highway commission chief engineer, said $670,000 has been set up in the 1948 road program for widening 5.26 miles to a 4-lane divided highway.

Montana—The highway commission recently awarded nine road construction contracts totaling $865,947. Five of the awards, higher than engineers' estimates, are subject to PRA approval. Bids on four other projects were rejected as too high. Projects included: A steel-concrete bridge near Fallon on the Terry-Glendive road; a steel-concrete bridge over Beaverhead River on the Dillon-Twin Bridges highway, and another over Judith River, Lewistown-Denton road.

Delaware—Highway construction projects totalling $8,930,000 are recommended by W. A. McWilliams, chief engineer of the state highway department. He listed 46 projects for new highway and bridge construction and for reconstruction of existing roads, and submitted this list to the highway commission for selection for the 1948 construction program.

The largest single project suggested for 1948 is the Elsmere, Del., grade crossing elimination, to cost $850,000. This is one of 19 projects totalling $4,615,000 suggested in New Castle country.

Center Hill Progress—Contractors are rapidly pushing work on Center Hill Dam across the Caney Fork River in Tennessee. The photo shows axis of the main dam structure, looking toward the left bank of the river. Contractors, under supervision of the Corps of Engineers, are the Massman Co. and Metcalfe Construction Co. and the Gordon Hamilton Contracting Co., Kansas City, Mo.

Maryland—Highway officials have urged more than 150 contractors and materials producers to expand their organizations so that the state's 5-year program involving between $180,000,000 and $200,000,000 can be realized. This year's proposed work is: Resurfacing and widening, 240 miles, divided into 60 to 70 projects to cost $4,500,000; ordinary highway construction, 100 miles, 20 to 25 projects, $24,000,000, and 3, six to eight expressway-type projects, expected to cost $11,500,000.

Kentucky—Highway Commissioner G. L. Withers says the state's highway districts will be increased from seven to nine. Each district engineer will have a maintenance engineer, and a district highway staff under him. The district engineer can handle the road problems of his district without passing details to the commissioner.

Missouri—The highway department plans to let contracts for the hard surfacing of about 489 miles of farm-to-market roads in 51 counties. The roads that have been selected are those most used in key sections. Highway department crews are stabilizing the gravel on the approved sections in fifty counties, preparing them for the mat surfacing course when the warm weather arrives.

Carl W. Brown, chief engineer, estimates that additional revenue of $173,015,000 is needed to complete the 10-year program for the improvement and extension of roads.

Illinois—Work will begin soon on the wrecking of the first buildings west of the Chicago River on the proposed route of the Congress Street superhighway. V. E. Gunlock, Chicago commissioner of subways and superhighways, says the finance committee of the city has approved funds to buy three buildings on the proposed route. Two structures are eight stories and one five.

Wesley W. Polk, chief highway engineer, of the state division of highways, has announced that Illinois Route No. 1 (the old "Dixie Highway") will be widened and resurfaced from Paris, through Danville, to Watseka, with all 16-ft. roadways eliminated.

North Carolina—Plans are being made by the Highways & Public Works Commission for a new $1,500,000 West Asheville bridge over the French Broad River. Traffic studies have been completed and it is proposed to construct a 4-lane bridge with 48-ft. roadway and two 6-ft. sidewalks.

HIGHLIGHTS OF MUNICIPAL DEVELOPMENTS

Miami lets $5.6 million sewer contract as other cities expand programs—Building codes up for overhauling—Other municipal news

Led off by the award of a $5,600,000 sewer extension contract at Miami, Fla., news of sewage disposal and waterworks projects highlighted the municipal engineering scene last week.

The Miami contract, first step in an eventual $15,000,000 expansion program, was awarded to the R. J. Holly Construction Co., Miami. The work is to cover construction of sewer extensions over almost two-thirds of the city's area. Additional contracts will be let to cover construction of a disposal plant and other facilities. The project had been originally estimated to cost about $10,600,000, but city officials said they had been advised by the Chicago firm of Greeley & Hansen, consulting engineers, that the cost may now go over $15,000,000.

At Mobile, Ala., voters recently approved expenditure of $2,000,000 for construction of sewers and sewage disposal plants. The project will consist of two disposal plants, one of 2.8 mgd. capacity and one of 1.4 mgd. capacity, and about 60 miles of sanitary sewers, ranging in size from 8 in. to 54 in. At Cleveland, Ohio, Mayor Thomas A. Burke made a move to encourage home construction in the city by inserting changes in the city's annual capital improvement budget to allocate an additional $500,000 for sewers and paving work. If the council approves the program, the city will issue bonds to pay for $1,250,000 worth of sewer improvements to cover new developments.

Several large projects were reported in the waterworks and water supply field.

At Des Moines, Iowa, the waterworks board of trustees awarded four contracts, totaling $1,903,000 for construction of a 48 mgd. water softener and filter plant. Contracts for buildings, basins and miscellaneous work were awarded to the Arthur H. Neumann & Bros., Des Moines. The remainder of the total will go for chemical and mechanical equipment.

At New Orleans, La., the Sewerage and Water Board approved plans for installation of a new large water main extension to cost nearly $3,000,000. The board's action authorized immediate advertisement for bids on furnishing cast iron pipe on a part of the project. The project, a part of the board's $6,000,000 improvement program, involves a 48 in. main from the purification plant on Eagle St. and through the city. The extensions, which will require two years to complete, will involve the largest expenditures by the board in the last 25 years.

Niagara Falls, N. Y., will make a survey of the possible demand on its water system by new industrial plants, to be used as a guide for future waterworks expansion, and the city of Little Rock, Ark., selected the engineering firm of Burns & McDonnell, of Kansas City, Mo., to make preliminary studies toward development of a new supply source.

Columbus adds engineers

Addition of 14 engineers and six inspectors in the Columbus, Ohio, engineering department is scheduled, in preparation for a street and sewer improvement program to begin next spring, and said to be the largest in that city's history, according to City Engineer Paul W. Maetzel.

The program involves resurfacing 37 and repaving nine old streets at a cost of about $1,500,000; a $1,500,000 street improvement program imperative to the city's housing development (to comply with requirements for FHA loans for building homes); elimination of 17 dangerous grade crossings, and the construction of one bridge and two viaducts. The crossing projects will cost about $5,000,000 and the three bridges about $3,800,000. Plans for the sewer improvements are being rushed to relieve storm flooding on the West Side. New West Side sanitary sewer outlets also will be started.

***Rollers**—Workmen lift into place the first of 12 giant roller-bearings that will be used on the new North State Street Bridge in Chicago. Heaviest bearing load will be 1,535,000 lb. on the center truss trunnions, which will be carried by four bearings of 25½ in. bore.*

Building code progress

The revision of existing and often archaic building codes continued to occupy engineering attention during the week, as several cities reported progress on current revision programs.

At San Diego, Calif., a revised draft of the building code reached its first public hearing in a very much streamlined condition, having cut the 180,000 words of the old code down to about 38,000 words. Prepared by City Building Inspector Oscar Knecht, the new draft, first revision since 1930, has been approved by the local chapter of the American Institute of Architects. The proposed statute would be a performance code.

In Milwaukee, city councilmen considered a resolution that called for easing of the city code requirements to permit approval of new housing that complied with minimum construction regulations of the Federal Housing Administration, excepting for heating, electrical work, ventilating and plumbing provisions of the city code. Councilmen had recently heard complaints from builders that the existing 33 year old code was preventing subdivision builders from pressing for annexation of their property to the city.

Complete revision of the building code of Jacksonville, Fla., with a view to eliminating obsolete features has been undertaken. Mayor C. Frank Whitehead asked twelve citizens to serve as members of a newly authorized building code committee to assist in revising the law.

The City of St. Paul, Minn., appointed a committee to revise its building code and employed A. H. Schroeder, a structural engineer, to do the actual writing. One of the first acts of the committee was to ask the city council to pass an ordinance making possible the use of new methods of construction, new materials, or a combination of new materials and new methods.

At Bar Harbor, Maine, recently badly damaged by forest fires, a new amendment to the building code was passed to permit property owners burned out in the fire to be exempt from restrictions by permitting them to rebuild on the old sites. Newer legislation calls for bigger building lots than many of the properties stood upon.

Approve increase in FHA insurance

President Truman last week signed a bill (H. R. 4675) greatly increasing the authorization of the Federal Housing Administration to insure mortgages on new residential construction under Title VI of the National Housing Act (*ENR* Dec. 25, 1947 vol. p. 852).

As finally passed, the measure increases the authorization by $250,000,000 immediately and provides for an additional $500,000,000 authorization at the discretion of President Truman.

Commissioner Franklin D. Richards of FHA has reported that the new authorization probably will be adequate to meet all authorization possible between now and March 31 of this year, the legal expiration date of the legislation. FHA's methods for selecting applications for processing and issuing commitments will be as follows: (1) Efforts will be made to see that most commitments issued are for rental units; (2) Commitments will not be issued in excess of a builder's capacity to complete construction during the term of the commitment; (3) Commitments will not be issued in excess of the estimated market absorption; and (4) Preferential consideration will be given to those applications offering the best possibilities for the production of housing at the lowest prices and rents. By following this procedure FHA hopes to combat inflationary construction prices.

At present, almost one-third of new residential construction is being financed by Title VI insurance, FHA reports. This work is an emergency activity and has no effect on the permanent insurance plan carried out under Title 11. This latter title permits insurance of mortgages on homes and large scale rental projects and it specifically directs the FHA to encourage improvement in housing standards and conditions and to provide a system of mutual mortgage insurance.

Pick engineer for S. F. Bay crossings

According to the *San Francisco Examiner* which quotes "authoritative sources in Sacramento," Ralph Tudor has been chosen by Charles H. Purcell, California director of public works, to head an engineering staff for the two new San Francisco Bay crossings.

It was learned, however, by *Engineering News Record*, that the appointment, although probable, will not become official until acted upon by the State Personnel Board, scheduled to meet Jan. 15. Negotiations for the position have been going on for some time among Tudor, Purcell and Governor Earl Warren.

A graduate of West Point, Tudor served many years with the Corps of Engineers, having been called back to service in 1941 and retiring as district engineer, Portland, Ore., in 1945 to take a position with Morrison-Knudsen. This he resigned while vice-president after spending two years in China for M-K International to form the firm of Seage and Tudor, joining forces with the well-known San Francisco consulting engineer, Clarence E. Seage, last July (*ENR*, Aug. 7, 1947, p. 114). Mr. Tudor was senior design engineer on the present San Francisco Oakland Bay bridge.

An engineering staff of about 50 is now being assembled and an office in San Francisco will soon be opened to launch preliminary surveys for the approved parallel span and the Army-Navy board recommended causeway tube crossing (*ENR* Nov. 20, 1947 vol. p. 699).

With much of the engineering data necessary for the second bridge already available, the group's first major task will be test borings on the lesser-known "Southern" crossing. Traffic surveys in both Oakland and San Francisco probably will be made to determine which crossing shall receive priority in time of construction.

Congressional committee fights nail "gray market"

After a meeting with producers representing 90 percent of the country's nail capacity, Senator Halph E. Flanders, chairman of a joint congressional subcommittee, announced a two-phase campaign against the "gray market" in nails. He said it will be attacked by: 1. Better policing on the part of nail producers to keep the supply in regular distribution channels. 2. Increased production—which will involve the delivery of more steel rods to nail manufacturers who do not produce their own steel.

The committee inquiry began as a result of reports that nails were being sold at two or three times the market price by beauty shops, hosiery stores, and chicken raisers. Flanders said investigation has uncovered the worst "gray markets," east of the Alleghenies, in the South and on the West Coast.

Truman OK's $32 million added Reclamation fund

A supplemental $32,011,000 appropriation for construction by the Bureau of Reclamation became available when President Truman signed the bill. (Public Law 393) providing extensive aid to Europe. This fund had been lumped with the European aid fund and was rushed through in a few days time.

Most of the money will be spent for four reclamation jobs. These projects and the amount for each are as follows: Columbia Basin, $13,584,000; Central Valley, $11,405,000; Colorado-Big Thompson, $4,150,000, and Davis Dam, $2,800,000.

No Panama Canal bill now before Congress

Although President Truman has requested that such a bill be introduced, as yet no measure has been placed before Congress calling for improvement of the Panama canal as a sea-level waterway the measure would be in accordance with the recent comprehensive report recommending this work at an estimated cost of $2.4 billions (*ENR* Dec. 11, 1947, vol. p. 787).

In the meantime, the report of the special board assigned to study the problem has been turned over to the Senate Armed Forces Committee and to the House Merchant Marine and Fisheries Committee.

Failure of the Panama government to approve an agreement with the U. S. regarding continuation of military bases outside the Panama Canal Zone has caused several members of Congress to state that once Congress is back in session they will introduce bill calling for construction of a new canal outside of Panama.

Canada requires permits for large construction

All large construction projects undertaken in Canada henceforth must obtain approval from the Canadian Department of Reconstruction, according to C. D. Howe, Minister.

Buildings for commercial, office, service and amusement purposes must be deferred, as well as government public works that are not urgently necessary for the public good, the Minister said. The program is in line with recently announced curtailment and reimposition of control on the Canadian construction industry. Priority is to be given also to projects that will bring a return in U. S. dollars.

Two utility companies to spend $380 million

Ralph H. Tapscott, president of Consolidated Edison Co., of New York, Inc., announced recently that the company's construction and expansion program for the next four years would cost $280,000,000. The company earlier had estimated that a five-year program would cost $250,000,000. At the same time, the Southern Natural Gas Co. announced a $100,000,000 expansion program.

Consolidated Edison and its system companies provide electricity in Manhattan, Brooklyn, the Bronx, Queens (excepting the Rockaway district) and most of Westchester County; gas in Manhattan, the Bronx, the first and third wards of Queens and most of Westchester County; and central station steam in parts of Manhattan.

The major portion of the four-year construction and expansion program outlined by Mr. Tapscott involves an expansion of the company's electric generation and distribution system.

Southern company expands

A 5-year $100,000,000 expansion program will be undertaken by the Southern Natural Gas Co. for Georgia, Alabama, Mississippi and Louisiana with expenditures to run between $20 million to $25 million a year, according to C. T. Chenery, chairman.

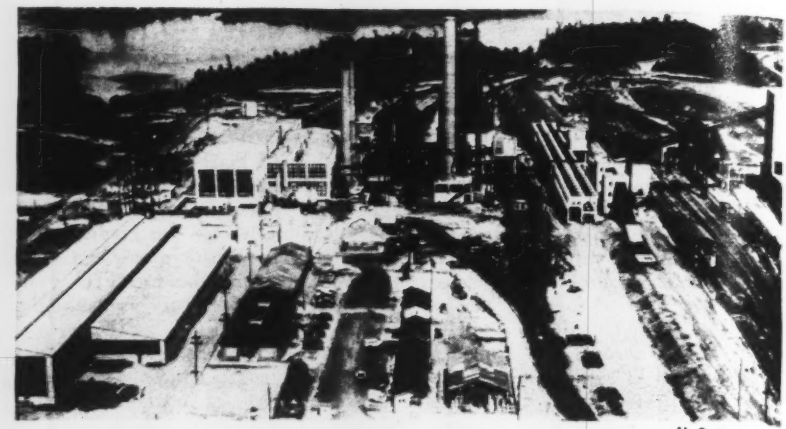
The first phase of the program will be the construction of 130 miles of loop lines to be added to the system in 1948.

Bids invited Jan. 15 for new Memphis harbor

First bids involved with construction of the new $18,000,000 harbor for Memphis, Tenn., will be opened by Army Engineers Jan. 15.

Actual work will start about May 1, or as soon as the spring low water season permits, according to Col. Louis H. Foote, Memphis District Engineer. The entire harbor project, which will take at least three years to complete, was authorized in the 1946 Flood Control Act. In addition to providing Memphis with an all-weather, all-purpose harbor, it will give it 7,850 new acres suitable for industrial sites with river frontage.

Bids now being advertised call for "rental and operation of one or two hydraulic, pipe line, cutter-head dredges and attendant plant" to be used in closing the head of Tennessee Chute and construction of a $5,130,000 dam between the east bank and President's Island.



U. S. Navy Photo

***Missile Tester**—A wind tunnel for the study of problems of supersonic flight, and a burner laboratory for testing ram-jet engines are now in operation at Daingerfield, Tex., for the U. S. Navy's Bureau of Ordnance. The tunnel, one of the largest operating supersonic wind tunnels in the world, is used to test scale models of missiles and models to yield basic aerodynamic data.*

Navy asks San Francisco for a deep-water berth

The Navy has asked the Port of San Francisco to provide a deep water berth to handle the largest battleships and cruisers.

The request was contained in a letter from Rear Admiral D. B. Beary, Commandant of the Twelfth Naval District, to the State Harbor Commission. It said that the berth would be of advantage for defense purposes.

Gen. Robert H. Wylie, port manager, reported that the desired courtesy berth would cost the port about $12,000 for initial dredging and from $8,000 to $10,000 annually for maintenance. The port at present maintains fleet landing facilities for small boats shuttling to battleships anchored in the bay.

Carolina Power & Light to build outdoor plant

Carolina Power & Light Co. plans the construction of a new steam-electric generating plant three miles south of Lumberton, N. C., on the Lumberton River, according to President L. V. Sutton.

The plant, part of a $25,000,000 new construction program, will be of the outdoor type—the first of its kind in that section of the country. It will have two 60,000 hp. units which are expected to go into operation in 1950. The generating units will operate at 1,250 lbs. steam at 950 deg. F., and the plant will use about 280,000 tons of coal per day.

The company now has eleven plants, nine of which are hydro.

Two contracts awarded for Oak Ridge labs

Two contracts, each of $1,000,000, have been awarded to the engineering firm of Patchen and Zimmerman, of Augusta, Ga., to plan buildings for nuclear energy laboratories at Oak Ridge, Tenn.

One contract is for planning a $1,000,000 metallurgical laboratory building for the Clinton National Laboratory and for alterations in buildings in the biological area of the electro-magnetic separation plant to be used by the personnel of the power pile division of the Clinton works.

The other contracts calls for planning another $1,000,000 structure for the nuclear energy propulsion studies of the aircraft division.

Canadian province plans new hydro-power plant

The British Columbia Power Commission will begin work immediately on a $3,500,000 hydro-electric plant at Whatshan Lake, a tributary of Lower Arrow Lake, Premier John Hart said last week.

The Whatshan Lake plant will produce 33,000 hp. and its current will be carried to Vernon in the South Thompson Valley and to Kamloops by power lines now under construction.

The new installation will include construction of a dam near the town of Needles, a tunnel extending about two miles from the lake to the west shore of Arrow Lake, and a power plant with the initial 33,000 hp. installed.

OBITUARY

Herman W. Ordeman, 59, for 13 years Richmond Borough engineer of N. Y. City, died in Frederick, Md., Dec. 31. He had retired in 1946 after 37 years of civil engineering.

Frank N. Blake, 93, North Adams, Mass., retired civil engineer and inventor, died Dec. 18. He gained recognition as the inventor of an electrical device to locate underground water and sewer pipes not charted on maps. He had been a member of the North Adams engineering department for 23 years when he retired in 1939.

George Howard Stewart, 73, assistant city engineer at Fayetteville, N. C., died Dec. 26.

Karl C. Kastberg, 74, Des Moines, Ia., assistant city engineer and member of the engineer's staff for 31 years, died Dec. 22. An 1894 graduate of Iowa State College, he had been supervising construction of a $400,000 Des Moines storm sewer for a number of years.

J. L. Weathers, 64, manager and former superintendent of the municipal public works commission at Fayetteville, N. C., died Dec. 23. Before going to Fayetteville in 1918 he held municipal engineering posts at Shelby, N. C., and at Lumberton, N. C.

William J. Wilson, 74, for many years superintendent of the Greenwich, Conn., Water Co., and lately superintendent of sewers for Greenwich, died at Stamford, Conn., on Dec. 24.

J. B. Macphail, 53, Canadian hydraulic engineer, for over 25 years with the Shawinigan Water and Power Co., died in Montreal on Dec. 22. A graduate of McGill University, he was in the Royal Canadian Engineers in the first world war, rising to major. He later became an outstanding investigator and designer of hydro-electric plants throughout the dominion.

David A. Kratzer, 61, for the last 10 years a design engineer for the Kansas State Highway Department, died at Omaha, Neb., Dec. 23. He was a 1909 graduate of Kansas State College.

Frank N. Blake, 93, civil engineer, and inventor of the electrical device to locate underground water and sewer pipes not charted on city maps, died Dec. 18 at his home in North Adams, Mass. He was employed in the North Adams city engineering department for 23 years having retired in 1939.

Charles H. Little, 73, inventor of a drafting machine unit for making engineering drawings, died Dec. 19 in Cleveland, Ohio. A graduate of Case Institute of Technology, he was employed by a number of companies as an engineer until 1937 when he formed the Universal Drafting Machine Co.

Architects seek remedy for housing shortage

Surveying the continuing acute shortage of housing, the board of directors of the American Institute of Architects last week released a four-point program for combatting the emergency.

The program called the shortage of apprentices in the building trades the most serious deterrent to an adequate expansion of housing work.

In a series of resolution, adopted at a meeting at Charleston, S. C., the board called the shortage of apprentices in the building trades the "most serious deterrent" to construction industry expansion, and called for an intensive program of apprentice training. Other points called for gradual elimination of rent controls, a conversion program to increase the number of rental units available to homeseekers, and a two-year, publicly-financed housing program that would be similar to the former USHA program, with some liberalization of terms to account for present high costs.

MAJOR MEETINGS

American Society of Photogrammetry, Wardman Park Hotel, Washington, D. C., Jan. 21-23.

American Society of Civil Engineers, annual meeting, Hotel Commodore, New York, N. Y., Jan. 21-24, 1948.

Canadian Construction Association, 30th annual meeting, Chateau Frontenac, Quebec, Que., Jan. 25-28.

American Road Builders' Association, and its Divisions, annual meeting, Willard, Mayflower and Statler Hotels, Washington, D. C., Jan. 26-28.

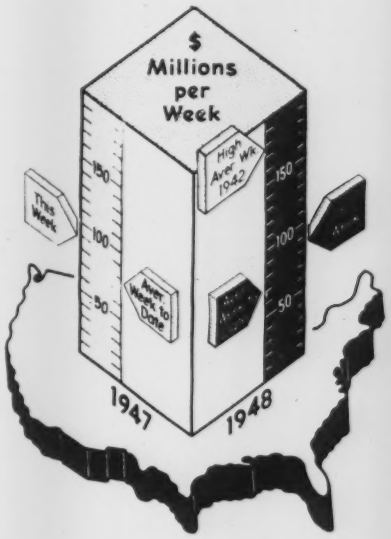
Associated General Contractors of America, Inc., 29th annual convention, Dallas, Tex., Feb. 9-12.

Associated Equipment Distributors, 29th annual meeting, Chicago, Ill., Feb. 15-19.

U. S. Conference of Mayors, annual conference, Waldorf-Astoria Hotel, New York, N. Y., Feb. 16-18.

American Concrete Institute, annual convention, Shirley-Savoy Hotel, Denver, Colo., Feb. 23-26.

CONSTRUCTION ACTIVITY



As Reported this week to . . .
Engineering News-Record

CONTRACT VOLUME

Continental U. S. Only
(Thousands of Dollars)

	Week of Jan. 8 1948	Cumulative 1948 (2 wks.)	Cumulative 1947 (2 wks.)
Federal	$12,094	$16,790	$14,822
State & Mun.	38,747	62,358	50,860
Total Public	$50,841	$79,148	$65,682
Total Private	34,834	60,891	86,659
U. S. Total	**$85,675**	**$140,039**	**$152,341**

WHERE CONSTRUCTION ACTIVITY ORIGINATED THIS WEEK

Dollar Volume (Thousands)

Type of Work	This Week	Cumulative 1948 (2 wks.)	Cumulative 1947 (2 wks.)
Waterworks	$1,984	$2,675	$10,461
Sewerage	2,123	3,100	4,282
Bridges	4,069	8,278	3,658
Highways	16,024	27,140	13,626
Earthwork Waterways	3,378	4,803	3,959
Buildings, Public	16,229	23,627	13,276
Industrial	6,972	12,713	18,088
Commercial	23,135	43,036	64,011
Unclassified	11,821	14,667	20,980

NOTE: Minimum size projects included are: Waterworks and waterway projects, $28,000; other public works, $50,000, industrial buildings, $68,000, other buildings, $250,000.

NEW PRODUCTIVE CAPITAL

	Cumulative 1948 (2 wks.)	Cumulative 1947 (2 wks.)
NON-FEDERAL	$31,846	$15,483
Corporate Securities	11,602	1,225
State and Municipal	20,244	14,258
Total Capital	**$31,846**	**$15,483**

ENR INDEX NUMBERS

Index Base = 100		1913	1926
Construction Cost	Jan.'48	434.99	209.10
Building Cost	Jan.'48	326.92	176.72
Volume	Dec.'47	251	110

EDITORIALS

VOLUME 140 NUMBER 2

January 8, 1948

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ENGINEERING NEWS-RECORD is a consolidation of Engineering News and Engineering Record, effected in 1917. The Contractor was consolidated with Engineering News Record in 1918. Engineering News was founded in 1874 as The Engineer and Surveyor, which title subsequently became The Engineer, Architect and Surveyor. Engineering News and American Railway Journal and finally Engineering News. Engineering Record was established in 1877 as The Plumber and Sanitary Engineer. Subsequently it became The Sanitary Engineer, Engineering and Building Record, and, finally, Engineering Record. All rights to the above titles are reserved.

Build For Trouble

SERIOUS STORMS over a large part of the middlewest and northeast sections of the country have played havoc with many a facility built to assure safe and civilized living. They emphasize anew that planning for trouble is one of the designer's greatest responsibilities. Dependent as we are on power, water, sanitation and transportation, it is encumbent to anticipate both means of avoiding trouble and methods of meeting it when it occurs. If ice storms are probable, buried power lines are not a luxury. If tornadoes are a local possibility, extra strength in building framing is justified, and refuge cellars are mandatory. When crippling snowstorms are frequent, transport safeguards must be provided. Designers recognize these necessities, but our recent experiences provide an added incentive to insist upon meeting them. Maintenance and repair requirements have an equal claim to be anticipated. New York City learned that its fine snow removal equipment fleet is still not adequate. Radio stations foresaw the need for some method of de-icing their high towers. Officials of the Long Island Railroad must have been impressed, as were the passengers, with the necessity for devising means of keeping its electric third-rail free of snow. Ottawa, Canada found that it should not remove all the snow from its streets, else the absence of this insulating blanket would permit frost to penetrate to its water supply mains. It is a time for living and learning. And engineers should learn that building for trouble is the best way to meet it.

Good Labor Relations

GOOD LABOR RELATIONS are secured only at a price. What a fair price is, in wage advances or other concessions, must be determined for individual conditions. In New York City the building construction industry and the mayor have proudly hailed new agreements fixing wages and working conditions until 1950. It is the hope that these agreements will stabilize construction costs and stimulate lagging building in New York City. In that hope everyone can join. But the same type of agreement to stabilize costs has been drawn up twice in the past year, each with concessions granted to secure worker approval of the "freeze" for the next two years. A clause (not in the new contracts) permitting renegotiation if other crafts got greater advantages nullified the earlier agreements in the building field. This is now avoided, but another difficulty still remains: labor relations in the heavy construction industry may be jeopardized by wage disparity with the building trades. It will be difficult to get a crew of carpenters, for example, on heavy construction at a $2.50 rate when there is plenty of work on buildings at $3. Wage rates in the New York area have gone up 50 percent since the war ended. Are good labor relations worth that cost?

Costs Threaten Highway Plans

MUCH long-range highway planning is being moved over into the visionary classification due to rising costs, according to some speakers at the Highway Research Board meeting. Projects that once appeared reasonably practicable now will be found to be without economic justification. More important, the resulting rise in the total cost of any state's program means that no money is in sight for many projects whose necessity is unquestioned. This indicates that the plans must be trimmed to a program that is patently inadequate or new sources of income must be found.

Landfill Fire Hazards

MANY COMMUNITIES, attracted by the virtues of the landfill method of refuse disposal, are adopting this practice without proper recognition of its limitations. Not the least of these are the hazards associated with the generation of heat and gases within the fill, which may result in fires or in explosions. Already we have on record several instances indicating that life and property may be jeopardized because of a lack of appreciation of these potential hazards. To focus attention on the matter and point to ways of coping with fires on a fill there is published in this issue an article on experiences at San Francisco. Operations at this landfill, which is one of the oldest, largest and most efficient of its kind in the world, merit the attention of everyone engaged in or planning to inaugurate sanitary fill

practice. The present article, concerned as it is with practical measures for minimizing fire hazards, deserves the most careful study.

Mechanized Incineration

ADAPTATION of industrial-type, materials-handling equipment to municipal refuse incinerators is outlined as an important step toward more effective and economical operation on p. 100 of this issue. Among the recommendations to improve incinerator feeding is the use of a single-line bucket to secure uniform charging. This equipment not only eliminates the need for overhead cranes and operator services, but is said also to assure better combustion. In addition, experience has shown that the disagreeable and difficult task of ash removal can be facilitated with a hydro-jet flushing system operating in a closed conduit. Quite aside from economies, this method is reported to accomplish thorough quenching and thus minimize complaint-causing odors. With labor rates constantly rising, the mechanization of incinerator operations may be one means for holding down costs.

Working in Leisure Time

STRONG OBJECTION is raised by Nomer Gray (*ENR*, Dec. 11, 1947, vol. p. 823) to a ruling by C. R. McMillan, chief highway commissioner of South Carolina, that forbids "off-hours" engagements by employees of the highway commission without written approval. Mr. Gray characterizes this action as an invasion of a fundamental right—that of doing what one pleases in off-time.

We agree with Mr. Gray as to the importance of this question now that most people in public service have more leisure time; and we will agree that the commissioner's ruling may be an invasion of a fundamental right. However, so is the rule-of-the-road requiring everyone to drive on the right-hand side. The important thing to determine in the case of this and like rulings is whether they are equitable; whether what some individuals must give up is more than offset by the evils that will be eliminated.

The evils are well known and appear to be widespread. Every civil service employee who takes an outside job takes that much work away from someone not on the public payroll whose taxes help to foot that payroll. Often, also the outside work is taken at rates below what a person with no other source of income must charge for similar work.

More fundamental is the objection that the shorter work week was established to spread work and provide more time for recreation. Both those objectives are lost when an engineer lays down his pencil in one office only to pick up another in an office around the corner. And generally the regular job suffers although it may be difficult to demonstrate that it does.

On the other side of the ledger are these facts: Increases in pay in civil service have not kept pace with increases in the cost of living, making it difficult for men in such service to make ends meet. Also, some men find real relaxation in work that brings them quite different problems from those involved in their regular job. And leisure time hangs heavily on the hands of many men who are apartment dwellers or who dislike physical exercise. They find stimulus in outside work, add to their experience and welcome the extra dollars.

Not to be overlooked is the fact that the continuing scarcity of engineers in many regions has created a demand for men who will take on work in their spare time.

Under these circumstances a rule that requires civil service employees to seek approval from their superiors before taking on remunerative outside work does not appear inequitable, provided common sense is applied to its administration. It has the great advantage of making the outside engagements a matter of office record, thus simplifying a determination of the effect of outside work on a man's regular production.

However, there appears to be no justification for the North Carolina highway department rule that remuneration from an outside job must be turned over to the department. Acceptance of such a ruling implies that the department, in hiring a man, controls all his time. Such is not the case. It is paying him for his best services for 8 hours of a day, and it would appear to have the right to see that what he does in the remaining hours does not lower his efficiency in those 8 hours. But if, in the exercise of that right, it permits him to engage in other work for pay, that compensation is his, and not the state's.

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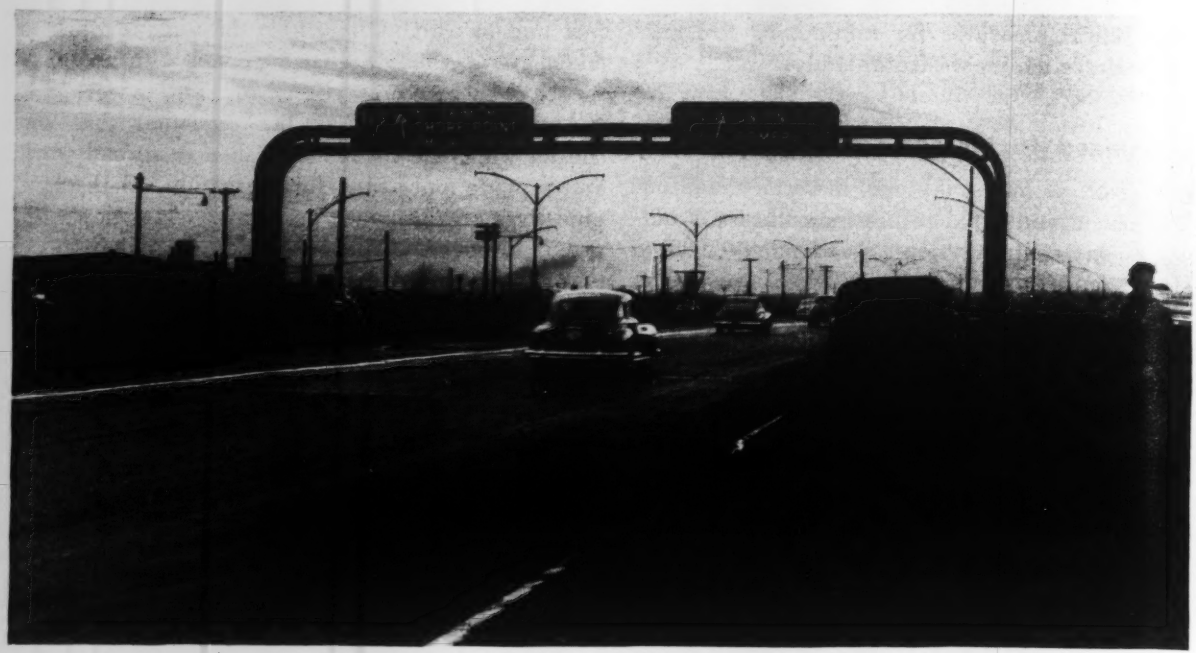


Fig. 1. Spanning the four westbound lanes 3,200 ft. from the intersection, these signs facilitate segregation of traffic.

Signs to Speed Traffic

Contents in Brief—A radical departure in marking highway routes at intersections has been made by the New Jersey Highway Department in widening of U. S. Route 1 to eight traffic lanes at the point where it is intersected by U. S. Route 22 and N. J. Route 21 on the outskirts of Newark. Direction signs with white neon letters 15 to 18 in. high are set on steel frames spanning the highway well in advance of the intersection to get traffic into the proper lanes. Similar signs are placed near actual points of departure, either overhead or on high standards at the side.

LACK OF ADEQUATE SIGNS that are legible at all times is slowly being recognized as a major source of congestion at intersections in addition to being an annoyance to motorists and the cause of accidents. To correct this condition on what is probably the most densely traversed highway in the world, the State Highway Department of New Jersey has just installed a group of signs that are a radical departure from past practices both in the character of the signs and in their positioning.

The new signs are on a 3-mile section of the Lincoln Highway (U. S. Route 1 and N. J. Route 25) between Elizabeth and Newark, which has just been rebuilt and widened to eight lanes divided into four 24-ft. pavements with 8 and 10-ft. paved shoulders. The two central roadways are for through traffic and the outer two are for local travel. Traffic on this highway averages 60,000 vehicles per day, and frequently reaches a peak of around 100,000.

Highway intersection rebuilt

In this three-mile section of rebuilt highway there are two intersections with major streets, which have been provided with overhead crossings, and a wye intersection with U. S. 22 and N. J. 21. U. S. Route 22 is one of the main highways to western New Jersey and Pennsylvania.

Reconstruction of this intersection, which had been a combined traffic circle and overpass, was undertaken to eliminate most of the circular movement and to feed the eastbound traffic from U. S. 2 into the local-traffic roadway of U. S. 1.

The old intersection was better marked than most similar intersections, especially for night driving, illuminated signs or reflectorized signs being used extensively, yet there still was some confusion, delay and congestion due to motorists slowing down to read signs. And it was realized by the engineers of the highway department that when the road was widened to four lanes in each direction, the normal type of directional sign on the shoulders would be of little value. The mass movement of vehicles, which included a high percentage of truck traffic, created a problem of placing the signs where they could be seen. In heavy traffic, the necessity of concentrating on driving may cause many drivers to miss seeing signs not directly in their line of vision. Hence the decision to use overhead signs.

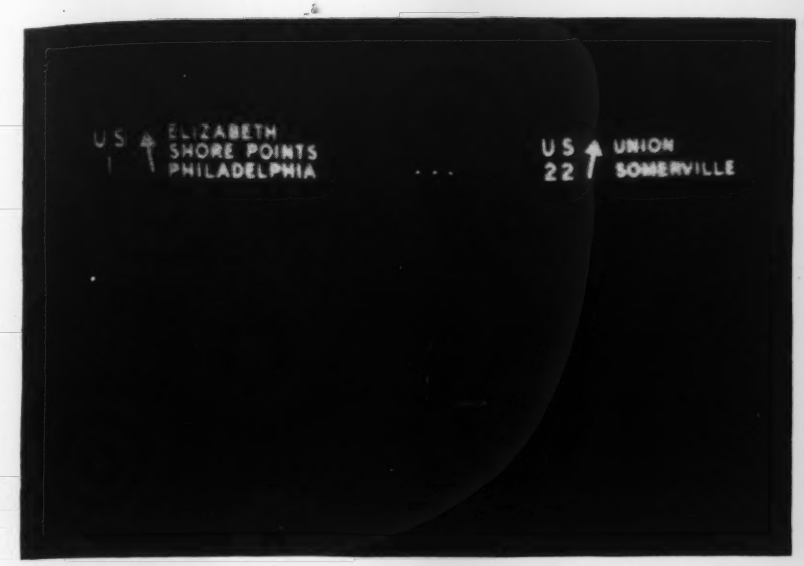


Fig. 2. At night there is no need for motorists to slow down to find and read the signs. This is the sign shown in Fig. 1.

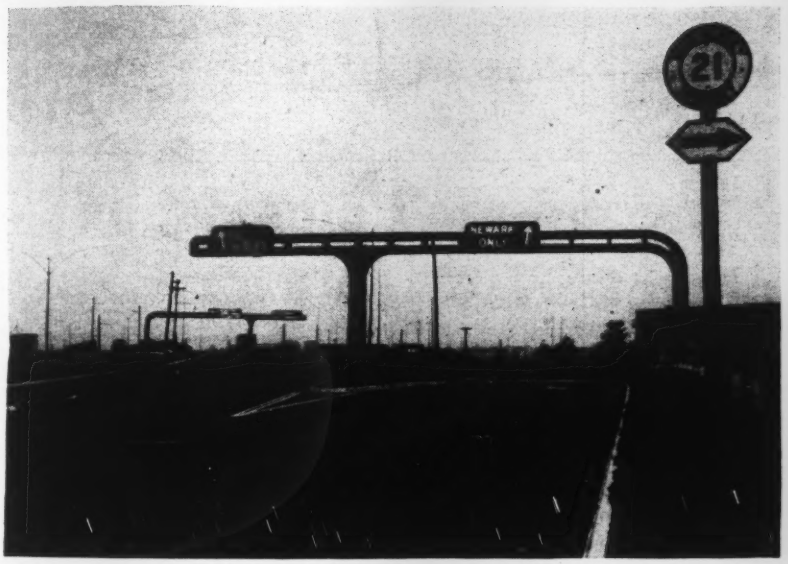


Fig. 3. As the intersection is approached, arrows indicate where the Newark traffic is to leave the traffic that is moving on toward the point where U. S. 22 leaves the main highway. This picture was taken at sunset when most signs facing westbound traffic are hard to read.

The overhead signs are supported on rigid-frame sign bridges of spans up to 86 ft. Details of one of these structures are given in Fig. 6, the parts being standardized as far as possible. At some points, signs are carried on cantilever arms from a bridge spanning only two lanes.

The signs are 8-in. deep metal boxes, of varying length and height, carrying channel-type letters 15 or 18 in. high, as shown in Fig. 5. The inside of each channel letter is painted white and through each channel runs a white neon tube supplied by power from within the box. As experience has shown that the life of neon tubes is longer when they are used continuously, the lights in the letters are never turned off. As a result the visibility of the signs is high at all times of day and night. Letters of this size can be read from as far away as 750 ft.

Power for the signs is supplied from nine sources and the numerous

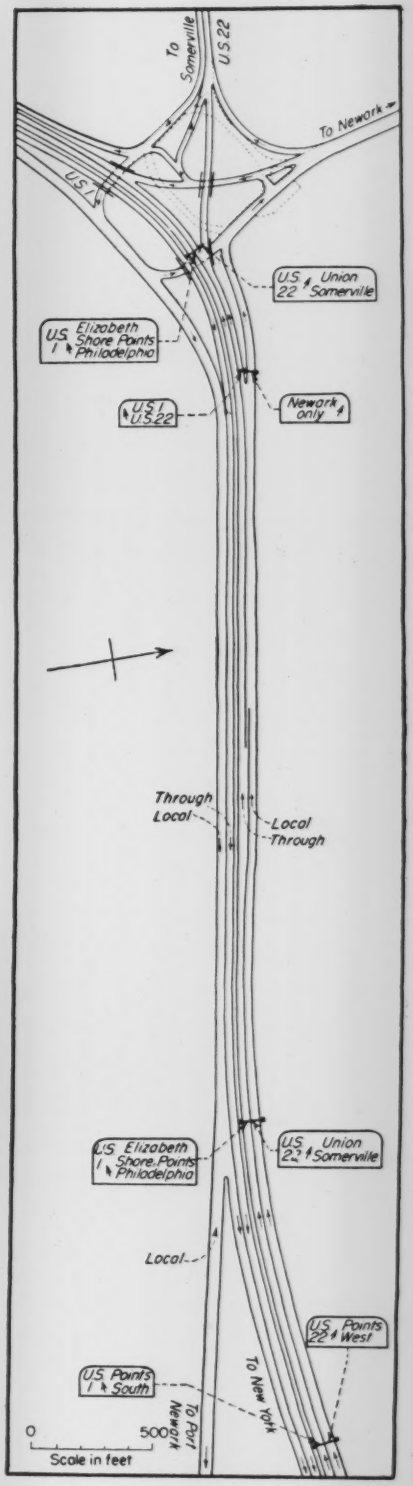


Fig. 4. Signs placed as shown on this drawing give westbound motorists warning of the fact that they are approaching a main intersection in ample time to move into the desired lanes without loss of headway. There are four lanes in each direction.

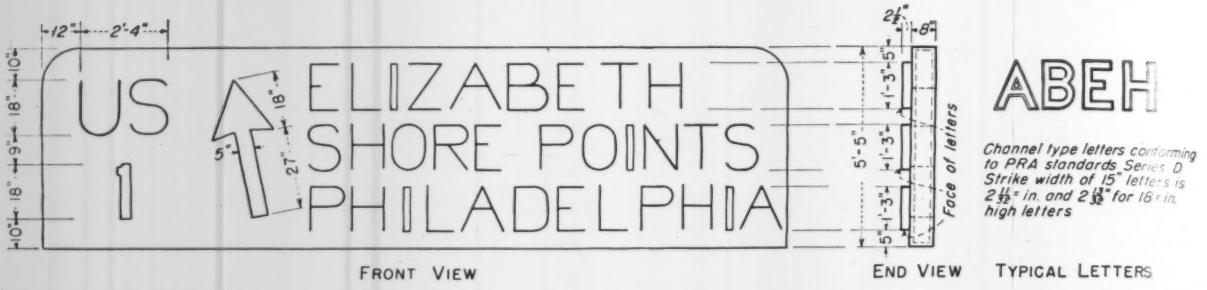

US 1
ELIZABETH
SHORE POINTS
PHILADELPHIA
ABEH
Face of letters
Channel type letters conforming to PRA standards Series D. Strike width of 15" letters is 2½" in. and 2⅝" for 18" in. high letters
FRONT VIEW
END VIEW
TYPICAL LETTERS

Fig. 5. Details of a typical sign. The letters are formed of neon tubes (white) recessed in white-painted steel channels. The neon tubes burn continuously, day and night.

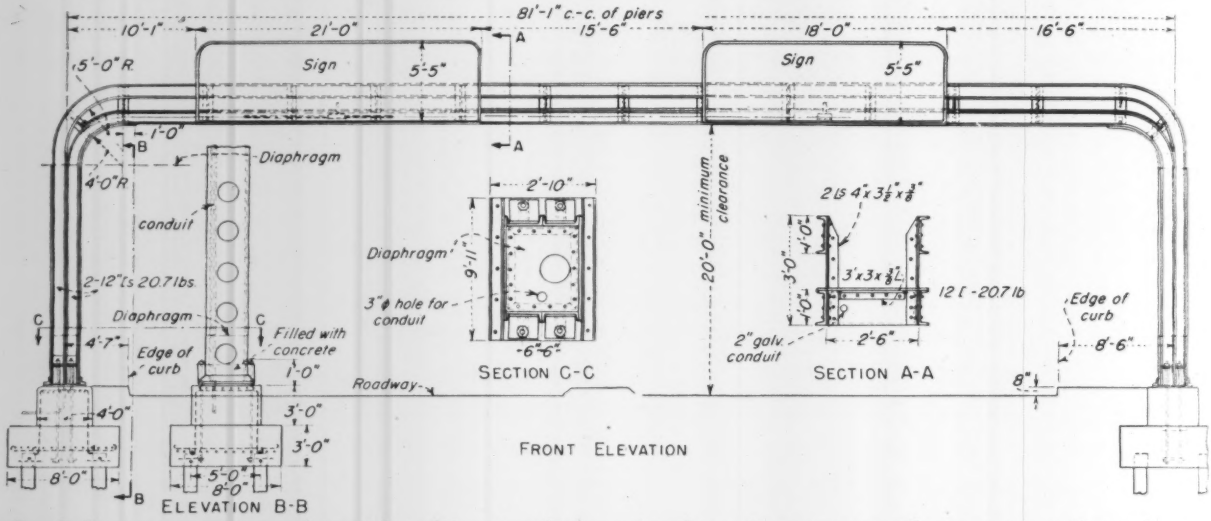


Fig. 6. Signs are carried on substantial steel frames either spanning the roadways or as cantilever arms over the roadway.

branch circuits are all fused. The series circuits for the highway lighting along this highway are fed from eleven sources. Should there be a power failure on the mains supplying the signs, the motorist probably would still be able to read the signs due to the high intensity of the highway lighting.

Advance segregation of traffic

Guiding signs to facilitate the segregation of traffic without loss of headway are placed as far as practical from each intersection. For westbound traffic, for example, the first sign indicating that the intersection with U. S. 22 is ahead is placed nearly a mile from the intersection. This is shown in Fig. 4, near the bottom. About 1,500 ft. beyond it is a larger sign with important place names. Between this sign and the next, which is 400 ft. from the point where U. S. 22 leaves U. S. 1, there is a slot in the traffic divider on the pavement through which vehicles in the through lanes can move over into the local lanes without any reduction in speed.

The next sign marks the lane by which Newark traffic leaves the main highway. It is marked "Newark Only" in large letters because it is in about the same location as the lane formerly taken by vehicles bound for U. S. 22 in passing through the old traffic circle. Traffic for U. S. 22 now is carried over the rebuilt circle in an almost straight line.

For those who make the mistake of following the old route, provision has been made in the rebuilt intersection for traffic entering the Newark lane to get through to U. S. 22 by a less direct route.

Similar signing is provided for eastbound traffic and for traffic moving through the two separated street intersections south of the main intersection. Illuminated signs of the same type but not carried on overhead bridges are used to mark these less important points of egress. In all there are 70 road markers, of which 27 are illuminated.

This reconstruction work was carried out under the general direction of J. Spencer Miller, Jr., commissioner, and Charles M. Noble, chief engineer of the highway department. Decision to use the overhead signs was made by Mr. Noble after an extended tour to study road marking on main highways. The design of the signs was under the direction of Ralph L. Fisher, engineer of design under the general supervision of H. W. Giffin, engineer of surveys and plans. The sign bridges were designed by O. H. Ammann, consulting engineer, New York.

Selbach-Meyer Co., West New York, N. J., fabricated and erected the sign bridges. The foundations were placed by the maintenance division of the highway department, Earl L. Storer in charge.

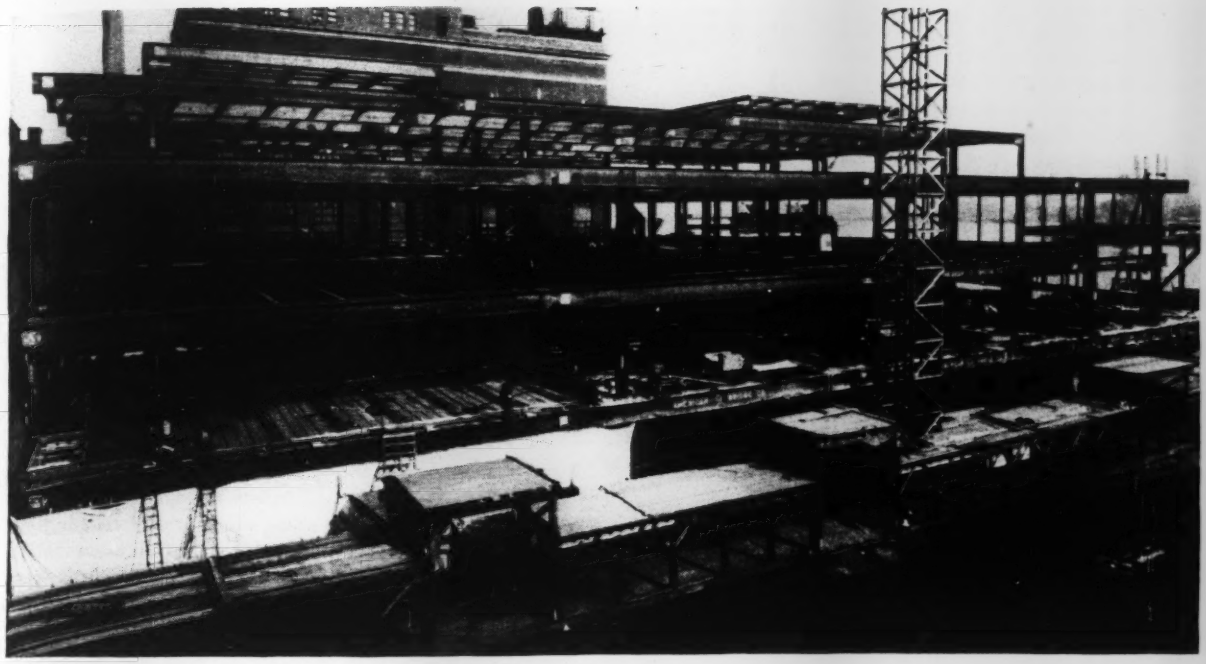


Fig. 1. Continuous steel girders in pairs, spanning up to 60 ft., run almost the full length of the 198 x 263-ft. plant of the Coca Cola Bottling Company of New York.

Rigid-Frame Base Supports Heavy Loads Of Five-Story Bottling Plant

***Contents in Brief**—The 5-story, steel-frame plant of the Coca Cola Bottling Company of New York is supported on drilled-in caissons, which are concreted in sockets in sub-surface rock and thus fixed against displacement at the base. At the second floor level, the caissons are rigidly connected to steel columns and, with the continuous girders of the superstructure, form a rigid frame. The structure is designed for truck loads on the second and third floors and storage, as well as office space, on the fourth floor.*

RIGID-FRAME construction proved to be an advantageous solution to difficult foundation and superstructure problems in the design of a 5-story plant for the Coca Cola Bottling Company of New York. Heavy floor loads are transmitted to continuous steel girders, from them to steel columns spaced up to 60 ft. apart and then to drilled-in caissons, which extend from the second floor to sub-surface rock.

The owner, a licensee of a company that supplies syrup, will use the new building for bottling and storing a beverage and loading for distribution. Thus, the structure is designed to support loads due to the weight of materials in storage and of pick-up trucks.

Located on a 198x263-ft. site close to the East River in midtown Manhattan, the plant extends on the east along Franklin D. Roosevelt Drive between 34th and 35th Streets, with the main entrance on 34th St. It has a structural steel frame, fireproofed with either vermiculite plaster or concrete, and exterior walls composed of 8-in. thick, cast-in-place concrete and 4-in. brick facing with limestone trim. Transparent, blue-tinted, heat-absorbing glass is used in continuous steel-sash windows around three open sides of the structure.

The fourth, or west, side of the plant abuts existing buildings of various heights and is windowless. To provide for extension of the building to the west, the wall used there is removable.

Floors carry heavy loads

The first floor is assigned to unloading, loading, and storage of trucks, with 10 entrances provided on 35th St. and the same number of exits on 34th St. A ramp leads to the second and third floors for pick-up purposes.

Although, on the second floor, some operating offices are located along the 34th St. side and space is provided for a water purifier, most of the area at this level is devoted to storage. The bottling shop is on the third floor and receives deliveries from and in return feeds to the first floor by means of belt conveyors. The fourth floor,

set back about 30 ft. from 34th and 35th St., is devoted to executive offices and syrup storage. A small penthouse provides space for board rooms, the president's office, and a tank room for sprinklers and standpipe water supply.

Factors affecting foundation design

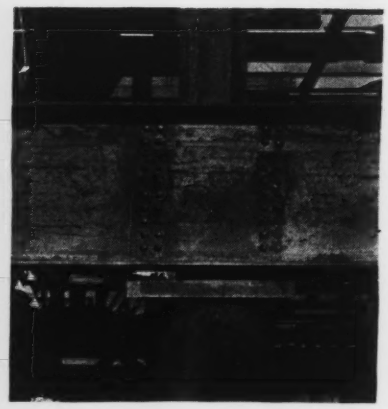
To provide the required storage capacity, the floor system had to be designed for heavy loads, and columns had to be widely spaced—24 ft. 6 in. apart in the north-south direction and 60 ft. in the east-west. A system of continuous girders was chosen for the floor construction to secure maximum rigidity using rolled sections rather than deep, fabricated members (Fig. 1). These characteristics influenced the selection of a suitable foundation, although site conditions were, of course, a major consideration.

Sub-surface water was found close to street grade. Borings revealed bed rock sloping uniformly from 80 ft. below grade at the west end of the lot to 175 ft. at the east end and overlying material consisting of soft rock, clay and sand over a considerable area. Obstructions in the form of concrete and timber bulkhead walls and wood piling were encountered at the river end of the site, and several layers of pavement consisting of concrete, granite blocks and other materials were found at various levels.

Thus, it was decided that the foundation should meet the following requirements: It should be non-yielding to preserve the alignment of the supports of the continuous girders. The supporting elements should be restrained laterally at the base in view of the soft sub-strata and the sloping rock surface. Because of the obstructions, the number of supporting units should be kept to a minimum. And bracing of individual piers at ground level, seriously affecting costs because of the wide spacing of columns, should be avoided.

Various types of foundation were considered and the drilled-in caisson (*ENR* Sept. 25, 1941, vol. p. 431) was selected because it met all requirements most effectively. Bracing of the shaft heads is met by continuing the caissons to the under side of the first tier of steel and utilizing the floor system for this purpose (Fig. 3).

The outer shell of a caisson, a ½-in. thick, 38-in. dia., spiral-welded steel cylinder with a steel driving shoe, is driven to rock. After entrapped material is removed from the interior of the casing, a 29-in. dia. socket is drilled into the rock to a depth of about 6 ft. by means of cable-operated tools inside the cylinder. Steel H-cores, size depending on the load, but mostly nominal 14-in. sections, are set in the socket and cut off flush with the top of the caisson. Then, the casing is filled with concrete.



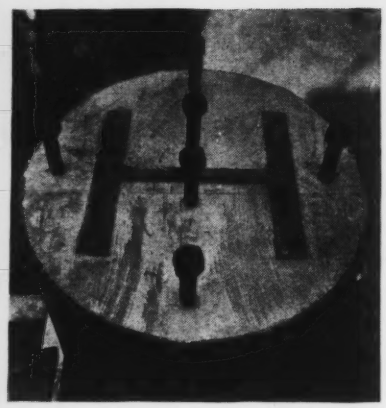


Fig. 2. Drilled-in caissons resting on rock with steel H-core and concrete filling extend to the second floor. A base plate welded to a steel column (top) is fitted over bolts embedded in the caisson concrete (bottom) and is welded to the casing.

Grade beams rest on pipe piles

Along Franklin Roosevelt Drive, which parallels the East River, the exterior wall and columns are carried on a grade beam on steel pipe piles. The grade beam is of reinforced concrete, 2 ft. 9 in. wide by 3 ft. deep, and is braced by reinforced concrete tie-beams to the first interior line of caissons. Used in pairs centered on the column lines, the piles consist of steel shells, with 18 in. outside diameter and ½-in. wall thickness. They were driven open-ended to rock or refusal, excavated and filled with concrete.

Along 34th and 35th Sts., the exterior walls are carried on double grade beams supported on caissons and steel pipe piles. Used in pairs at the third points of each bay to carry door mullions, piles consist of 10¾-in. steel shells having ⅜-in. wall thickness. They were driven with closed ends to a penetration sufficient to develop a carrying capacity of 25 tons each and filled with concrete. Each grade beam consists of two reinforced concrete beams, 3 ft. deep by 12 in. wide with a clear distance between them of 3 ft. 6 in., and a 9-in. thick top slab.

For the first story height, the west wall between 34th and 35th Sts., is hung from the second-floor beams so as not to interfere with the foundations of the adjacent buildings. At the base, the wall rests on steel beams, which are braced by means of 10-in. WF 49-lb. beams to the nearest line of caissons.

Floor-system design

Because of the presence of subsurface water close to street grade, the building has not been provided with a basement. The first floor is an 8-in. thick reinforced concrete slab on fill. Above street level, the floors are 5 in. thick and composed of 3,000-psi. concrete with metallic hardener finish. The second and third floors are designed for a uniformly distributed load of 300 psf. and a 12-kip concentrated load placed for maximum effect.

Floorbeams, mostly 21-in. WF 59 lb., are spaced about 8 ft. apart, spanning about 21 ft. 6 in. in interior panels and about 31 ft. in end panels. They are supported on continuous 36-in. WF girders, which are reinforced with top and bottom plates to resist end moment. Running almost the full length of the building in pairs, but joined by 36-in. WF separators, the girders are set on either side of the columns.

At the end of the plant abutting adjacent buildings, the girders cantilever 16 ft. past the last line of columns, so that there are no columns along the west wall (Fig. 1). Adja-

Fig. 3. Spaced 3 ft. apart, 36-in. WF continuous girders, set on either side of steel columns, support concrete-encased floorbeams spaced about 8 ft. apart and 5-in. thick concrete floor slabs designed for truck and storage loads.

cent to these cantilevers, there are three successive 60-ft. spans. Then follows one of 28 ft., and in the end bay at Franklin D. Roosevelt Drive, there is a simple-beam span of about 36 ft.

Around the three open sides of the building, an 8-in. by 4-ft. deep concrete spandrel is carried on the steel girders and is braced at about 15-ft. intervals by 6-in. H-columns. One story high, these columns extend between girders and are connected to them at the base by means of a slip joint, so as not to transmit loads from the girders on one floor to those below.

Beams and girders are embedded 3 in. in the floor slab. Since the beams are encased in concrete (Fig. 3), the designers were able to take advantage of a provision in the New York City building code to increase the allowable maximum bending stresses in the beams from 18,000 to 20,000 psi. Because the girders are not encased in concrete, they were designed for 18,000 psi. However, the girders are fireproofed with vermiculite plaster on metal lath around the exterior of each pair. Steel columns, girder separators and the portion of the caissons above grade are also encased in concrete.

A unique feature of the design is the integration of the substructure and superstructure. Caissons are extended to the underside of the second floor, where they pick up the steel columns (Fig. 2, top). With the continuous girders and the steel columns, they form a rigid frame that is fixed at the base by virtue of the embedment of the caissons in concrete in sockets in the rock. Moments in this frame were determined by single-cycle distribution based on angle rotations (*ENR* April 13, 1933, p. 462).

To make the connection at the top of each caisson, six ¾-in. dia. anchor bolts were set in the concrete (Fig. 2 bottom). A column to which was welded a 3-ft. square by 4-in. thick base plate was then set in place, and the plate was bolted and later welded to the steel casing of the caisson.

Walter Monroe Cory is architect and Rene L. Bertin structural engineer. American Bridge Co. holds the contract for steel, Turner Construction Co. for concrete and masonry, and Spencer, White and Prentis for foundations.

How to Control Cracks in Portland-Cement Plaster

Out of studies undertaken by the Bureau of Reclamation a method of construction has been developed at Grand Coulee Dam that has resulted in portland-cement plaster work so satisfactory that bureau specifications are being revised to conform to it. This work is described in a paper, "Crack Control in Portland-Cement Plaster Panels," by Bert A. Hall in the *Journal* of the American Concrete Institute, Oct., 1947.

Most of the objectionable cracking in portland-cement plaster is caused by volume changes due to shrinkage as drying occurs.

Mr. Hall points out that the new method of construction provides for shrinkage of plaster slabs without cracking by leaving a joint between ceiling and wall slabs and around fixtures so that each of the slabs is entirely free to move. Bond between ceiling plaster and a concrete wall can be prevented by a coat of paint or hot paraffin, or a strip of tape or some similar material.

Several methods of concealing the openings may be resorted to, including use of moldings, ornamental beads or strips, and plastic fillings. One way is to place the ceiling plaster before that for the wall. Then, the wall plaster can be placed to cover the ceiling joint, with bond to the ceiling prevented.

Mr. Hall also claims that if drying conditions are properly regulated, the successive coats of portland-cement plaster can be placed at intervals of not over 24 hours and no coat need be damp-cured until the last coat is hard enough to receive water without damage. Then, if too rapid drying is prevented, much less water cure is needed than has been customary heretofore. Slow, uniform drying is of utmost importance to allow the plaster to gain full strength and shrink uniformly.

Advantages of this method of construction, as listed by the author, include cutting time of completing plaster from the 10 to 20 days previously required to 3 to 6 days. Savings are effected in the cost of curing and protecting plaster during the drying period. Also, this method allows plasterers to leave scaffolding and equipment in place until a room is finished.

Application has been made by the bureau for a patent.

Fig. 1. A general view of the face of the fill from the water side, showing smoke from several fires.

Gas Fires in a Sanitary Fill

Contents in Brief—Spontaneous combustion ignites gases from decomposing garbage along the face of San Francisco's sanitary fill when precautions to prevent fires are not taken. The fires are easily controlled, can be prevented by care in operation of the fill. Methods now proposed are expected to eliminate them almost entirely.

SAN FRANCISCO'S GARBAGE, now averaging about 830 tons per day, has been disposed of effectively in a sanitary fill for 15 years. Because the material used for cover has included a high percentage of rock, resulting in some internal voids, and because rather high faces have been necessary at times on the advancing outer edge of the fill, there has been considerable experience with gas from decomposition and gas fires along the face of the fill, ignited by spontaneous combustion. These fires have involved no danger on this fill because it always has been possible to control them by easily applied methods and the prevailing winds carry the smoke away from the shore along which the fill is being made.

For use in other locations, however, information about these fires that has been gathered at San Francisco through the years, may be of value for the record. Descriptions of the operation of this fill have appeared in *Engineering News-Record* Apr. 22, 1943, vol. p. 540 and 554 and Sept. 5, 1946, vol. p. 296. The following notes in large measure comprise data obtained from officials in charge of the fill, notably the comment and opinion of L. P. Brassy who has supervised operation of the fill since it was started. The gas analysis was obtained through the cooperation of Ralph G. Wadsworth, city engineer of San Francisco.

The fill is being made along the shore of San Francisco Bay in an area where there is deep mud bottom. At present the outer portions of the fill are about 18 ft. above the mud line. However, judging from the number of layers of garbage and cover material that have been deposited before the fill reached this height, it is believed that there is at least a 50- and 60-ft. total depth of fill and garbage at locations where the surface is only 18 ft. above the mud line. The advancing mud wave forced ahead of the fill by this settlement is in tidewater and is subject to continual erosion by successive tides.

Whenever the face of the fill has attained heights of more than about 12 ft., there has been a tendency to settlement and consequent opening of cracks in the face which admit air, and hence oxygen, to the inner layers. In the inner portions of the fill thus exposed, decomposition has been in progress, resulting in temperatures believed to range from 160 to 180 deg. F. This heat dries out the fill and causes vaporization of volatile materials. These vapors contain gases that will ignite by spontaneous combustion due to the presence of rapidly oxidizing materials—such as paints, linseed oil or other chemicals occasionally present in industrial wastes that get into garbage.

Flame has low temperature

A characteristic result of this combination of conditions is the burning gas flame issuing from cracks in the face of a high fill. On the San Francisco fill this flame is most often colorless and notable for its low temperature. Dry wood in the path of the flame does not immediately char and catch fire. However, with the jet burning constantly dried-out garbage and inflammables—such as newspaper, soon do catch fire and if these spontaneously ignited gas jets are not extinguished they will create a general fire all along the face of the fill. From such fires smoldering, smoking garbage extends into the fill as far as air can penetrate between successive layers of earth coverings.

Moreover, if these fires are not checked the volume of combustibles consumed becomes great enough to cause additional caving of the fill and the exposure of more fuel for the fire.

Fig. 2. This fire, ignited by spontaneous combustion, has burned under the cover material and will cause caving of the face. Note burned garbage at left.

Hence the face of the fill soon becomes so deeply fire-pitted that restoring proper cover of the garbage requires considerably more time and material than would have been necessary if the fire had been quickly extinguished.

Gases that form in this way involve no danger of explosion and the control of a gas fire is very simple in that it is only necessary to bulldoze over it enough earth cover to choke off the supply of oxygen, after which the combustion ceases entirely. These fires occur only along the advancing face of the fill. They have never developed in the completed portion of the fill where the earth cover prevents access of air to garbage.

There has been some thought that the proximity of this fill to salt water and the deep mud below it have some bearing on the quantity and kind of gas developed. It is known that hydrogen-sulfide gas is given off from the tide flats and it is held possible that a considerable part of the gas that ignites comes from deep layers of the fill below water.

A sample of gas for chemical analysis was taken from a hole put down in the fill for this express purpose. The hole, about a foot in diameter and 5 ft. deep, was dug where the fill is some 12 years old. After the hole was dug it was covered with a board and left undisturbed for a few days. A hole was then drilled through the board and the gas sample was taken through a rubber tube whose end was lowered to within 2 ft. of the bottom.

This sample was found to be diluted with air as indicated by the oxygen content in the following:

Carbon dioxide	11.0%
Oxygen	12.0
Methane	26.1
Hydrogen	3.7
Nitrogen (combined with air)*	44.7
Nitrogen (combined with gas)*	2.5

* Nitrogen calculations by difference based on air at 20.95% oxygen.

The analysis of the gas itself (exclusive of the air) based on the above analysis would be:

Carbon dioxide	25.4%
Methane	60.3
Hydrogen	8.5
Nitrogen	5.8

In commenting on these results Mr. Brassy said: "This analysis indicates the presence of considerable air (oxygen-nitrogen combination) that certainly could not originate in the garbage layers through which the test-hole was driven. This air probably entered by passing around the board covering the top of the hole. It would be natural for air that replaced the lighter methane to settle to the lower part of the hole. I think a gas sample taken near the top of the hole would give a mixture like that listed under the second analysis; that is, the analysis corrected to show results exclusive of air.

"In further support of the opinion that oxygen-nitrogen is not to be found in undisturbed fill, is the fact that all test-pits and test-holes that have been put down to date in fill ranging from 12 to 15 years old, produce garbage samples in which vegetables still retain their color and texture; cloth and paper, though damp, show no indications of rot or deterioration and tin cans are still bright and free from corrosion. This definitely indicates the absence of free oxygen in the covered fill."

The San Francisco fill had an unusual amount of spontaneous combustion during the late summer months of 1947 when the garbage was being delivered in gondola cars at the rate of 40 to 50 cars per day, unloaded by grab bucket and spread with a bulldozer. In this operation garbage layers ranged up to 15 ft. thick. Cover material between successive layers was from 1 to 1½ ft. thick.

With the changeover from delivery by railroad car to delivery by dump truck, which began on Sept. 25, 1947, it was expected that the slope on the advancing face of the fill would be much more easy to control than has been the case previously. Under the new program in which the cost and delays of moving railroad track will be avoided, successive layers of garbage will be only about half as deep as formerly and it will be possible to avoid the high, steep face that attended operations from a railroad track. Thus it is believed that the cracking on the face of the fill, the spontaneous combustion and the resultant fires that have previously burned, on occasion, along considerable lengths of the face will be almost if not entirely eliminated.

Experience in controlling fires on the San Francisco fill indicates that if conditions permitting fires to start cannot be prevented, vigilant watch should be maintained and fires should be controlled in their early stages. The simplest and easiest control is by smothering, thus preventing the access of air to support combustion in the danger zones.

Some experimenting was done with the use of small portable (two-man) gasoline engine-driven pumps using salt water from the bay. This is the cheapest and quickest method of extinguishing small fires. However, once the fire has burned deeply into the fill water does not suffice because it is difficult to get it down into the deeper areas where smoldering and burning will continue. Sometimes a combination earth-and-water program has been found effective. The earthfill is put on to provide the immediate smothering and the water provides supplementary control.

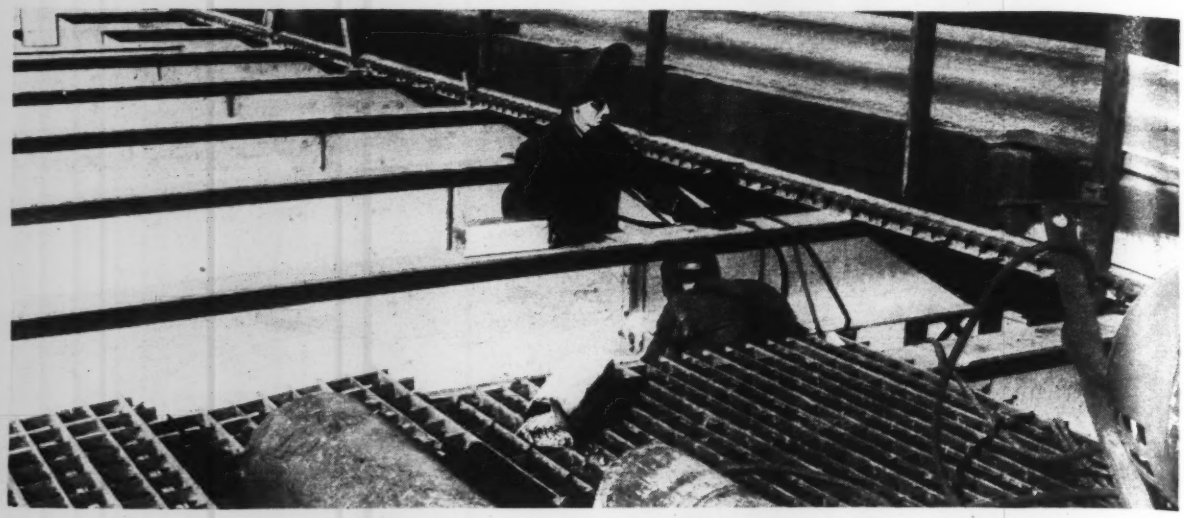


Fig. 1. Welding the wide-flange beams that carry the new steel and concrete deck on Eads Bridge at St. Louis.

Welded Highway Deck Cuts Dead Load on Eads Bridge

Joshua D'Esposito, Jr.
Assistant to the President, William J. Howard, Inc.
Chicago, Ill.

***Contents in Brief**—Advantages of lessened dead load, improved gradients for vehicular traffic and increased vertical clearance for railroad tracks on the lower deck, added to economy in cost as compared with other plans, dictated the decision of the Terminal Railroad Association of St. Louis to replace the timber highway deck on steel floor beams of the famous Eads Bridge with a welded deck of steel grating on a floor system of wide-flange beams. Lightweight concrete fill was placed in the grating to minimize deck loading. By rebuilding one side of the four-lane roadway at a time, the owners completed the reconstruction without appreciable interference to highway traffic. Field welding of 11,000 connections facilitated the assembly of new steel members of the 73-year-old bridge.*

THREE possible plans received consideration by the Terminal Railroad Association of St. Louis early in 1946 when it became evident that the upper highway deck on the three main spans of the world-renowned Eads Bridge across the Mississippi River would have to be rebuilt. Except for renewals and strengthening of this deck and of the lower, railway deck during the intervening years, the bridge then stood essentially as built by James Buchanan Eads in 1867-1874. Several times during the 73 years of continuous use, the timber stringers and decking and the riveted steel and wrought-iron floor system of the highway deck had undergone repairs and renewals in kind, the last replacement of the timber portion having been made in 1934.

Renewal in kind was considered again in 1946, as was also construction of a new highway bridge superimposed on the present piers and entirely independent of the existing arches and railway deck. Neither of these possibilities could compete on a basis of cost and feasibility with a third plan, to construct a complete new welded steel floor system incorporating wide-flange floorbeams and stringers on existing columns, supporting a deck of steel grating filled with lightweight concrete. This plan best fulfilled the basic requirement of adequate strength with minimum weight, at reasonable cost.

A catalog could be enumerated of the advantages which persuaded the owner to adopt the welded steel floor system and deck grating, with lightweight concrete fill. Briefly they are these: (1) Eliminate 1,230,000 lb. of dead load on 1,536 lin. ft. of bridge; (2) increase railroad clearance from 16½ to 18 ft. on all spans, thereby decreasing locomotive blast effect; (3) increase the width of the four-lane roadway from 38½ to 41 ft.; (4) reduce highway grades and improve sight distances by lowering the deck 39 in. at the center of the bridge and raising it 9 in. at the ends; (5) increase the load-carrying capacity from a weak H-15 to a strong H-20;

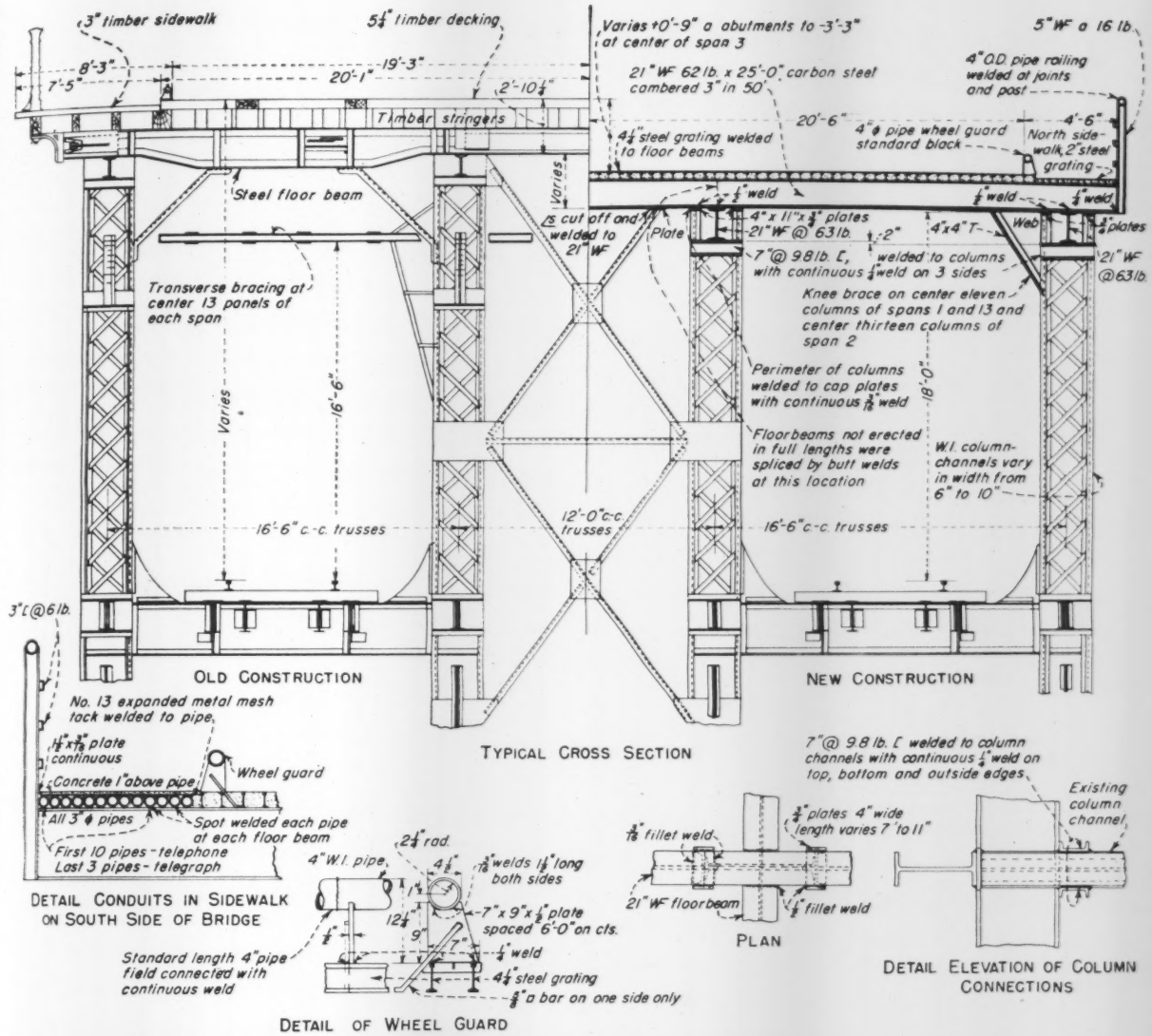

3" timber sidewalk
5¼" timber decking
8'-3"
7'-5"
20'-1"
19'-3"
2'-10¼"
Timber stringers
Steel floor beam
Varies
Transverse bracing at center 13 panels of each span
16'-6"
16'-6" c-c. trusses
12'-0" c-c. trusses
Varies +0'-9" a abutments to -3'-3" at center of span 3
21" WF 62 lb. x 25'-0" carbon steel cambered 3" in 50'
5" WF a 16 lb.
4" O.D. pipe railing welded at joints and post
20'-6"
4'-6"
4¼" steel grating welded to floor beams
4" ϕ pipe wheel guard standard black
North side-walk 2" steel grating
½" weld
¼" weld
4" x 11" x ⅜" plates
21" WF @ 63 lb.
2"
4"x4" T-
Web
¼" plates
21" WF @ 63 lb.
7" @ 9.8 lb. ℄, welded to columns with continuous ¼" weld on 3 sides
Knee brace on center eleven columns of spans 1 and 13 and center thirteen columns of span 2
Perimeter of columns welded to cap plates with continuous ⅜" weld
18'-0"
Floor beams not erected in full lengths were spliced by butt welds at this location
W.I. column-channels vary in width from 6" to 10"
16'-6" c-c. trusses
OLD CONSTRUCTION
NEW CONSTRUCTION
TYPICAL CROSS SECTION
3" ℄ @ 6 lb.
No. 13 expanded metal mesh tack welded to pipe
½" x 3⅜" plate continuous
Concrete 1" above pipe
Wheel guard
All 3" ϕ pipes
Spot welded each pipe at each floor beam
First 10 pipes - telephone
Last 3 pipes - telegraph
DETAIL CONDUITS IN SIDEWALK ON SOUTH SIDE OF BRIDGE
2¼" rad.
4" W.I. pipe
⅜" welds 1½" long both sides
7" x 9" x ½" plate spaced 6'-0" on cts.
12¼"
9"
7"
¼" weld
4½" steel grating
⅝" a bar on one side only
Standard length 4" pipe field connected with continuous weld
DETAIL OF WHEEL GUARD
7" @ 9.8 lb. ℄ welded to column channels with continuous ¼" weld on top, bottom and outside edges
⅜" fillet weld
⅜" plates 4" wide length varies 7" to 11"
21" WF floor beam
¼" fillet weld
PLAN
Existing column channel
DETAIL ELEVATION OF COLUMN CONNECTIONS

Fig. 2. Reconstruction of upper deck of Eads Bridge, using steel grating with lightweight concrete fill on wide-flange floor-beams and longitudinal beams, with all connections field-welded, reduced the dead load 810 lb. per lin. ft., improved the width and gradients of the four-lane roadway, and increased vertical clearance above railroad tracks on the lower deck.

(6) save an estimated $30,000 over replacement in kind; (7) extend the estimated service life from 15 years to 50; (8) obtain a non-combustible structure; (9) improve the lateral and longitudinal rigidity against wind; (10) improve the riding qualities of the roadway, with greater safety at high speeds.

The design that encompassed these advantages is shown in Fig. 2. As a foundation for understanding the overall scheme, a word should be said about the three channel spans of the Eads Bridge.

Scope of the new work was limited to replacement of the highway deck and its floor system on the three river spans, which are 502, 520, and 502 ft. long. Each of these spans is made up of four hingeless arches spaced on 16½-12-16½-ft. centers. Each arch consists of two tubular ribs 18 in., in diameter, spaced 12 ft. radially and tied together with a web system of eyebars. The tube forming each rib is made up of six chrome steel staves inside a wrought-iron envelope.

Limitations of steel manufacture, fabrication and erection in 1870 required the use of short structural members, and a panel length of about 12 ft. was adopted. Rib sections are of about this length, with the six staves in each section being banded and machined at the ends with grooves into which the split couplings fit. The staves were tested in a machine built for the purpose to a tensile stress of 50,000 to 60,000 psi. without reaching their elastic limit, indicating an ultimate strength of 120,000 psi. or more.

Steel specifications for this bridge are thought to be the first in the United States to employ the two terms, modulus of elasticity and elastic limit. Original design stresses for steel were 30,000 psi. in compression and 20,000 psi. in tension. A safe working stress today for main members is considered to be 40,000 psi. in compression, although few members are ever that highly stressed.

Fig. 3. Expansion devices transmit the wind load stresses to the masonry piers from the all-welded floor system and deck.

Fig. 4. Floor system and supporting columns as viewed from lower deck. Increased clearance is gained above the railroad tracks on the lower deck by eliminating the old lateral bracing below the roadway floor system. The old bracing is shown in Fig. 2 on the preceding page.

Arch ribs were erected by means of tiebacks without falsework. The double-ribbed, fixed arches are braced transversely by pipe struts and adjustable rods and diagonally by adjustable rods. Deck loads are carried to the upper ribs through channel columns to pins which pass through the couplings.

Use of short panels in the original design resulted in a profusion of joints and a multitude of surfaces in action. On the three arch spans there are 1,048 splices of main members, some of which have a reversal of stress with the passage of each train; fortunately these connections are few and are the least highly stressed. Despite the many surfaces in action during nearly three-quarters of a century, there is not now, nor has there ever been, a loose joint or connection of a main member or any signs of fatigue, distortion or wear. The bridge stands today as an admirable example of thoroughness of design and precision of fabrication and erection.

Reconstruction of the highway deck was a matter of necessity and not of choice. Studies undertaken several years ago showed that 90 percent of the floorbeams needed, or would soon need, replacement. Timber stringers were softening and failing rapidly at bearing points. The wind truss was so badly corroded that its value was highly questionable. Stability of the timber decking in a strong wind depended almost entirely on its weight. Portions of the floorbeams were remnants of those originally placed in the bridge; considering their loss in sectional area, they could carry 20-ton truck loads only out of habit.

Welding facilitates reconstruction

A forest of 524 columns supports the highway deck above the arch ribs on the three main spans. Because of the short panel lengths of the original design, a total of 11,000 field connections had to be made during replacement of the highway deck, to the grades as built.

This myriad of connections, and the necessity of carrying out the work on a field fabrication and assembly basis, dictated welded construction of the replacement structure. There was, for practical purposes, no standardization of panel lengths or spacing of the individual members of the highway floor system. For ease and economy of erection, it was imperative that a system be employed which would avoid the tedious and costly steps of riveted construction: individual field measurement, detailing and shop layout for fabrication of each member installed, plus field drilling and reaming of over 4,000 connections of two or more rivets each, and riveting of over 7,000 other connections.

For these and other good reasons, the new highway deck is all-welded. As indicated by Fig. 2, the design adopted and built consists of 4½-in. steel grating (in fabricated panels incorporating longitudinal I-beam on 6-in. centers) welded to 21-in. 63-lb. wide-flange floorbeams spaced about 6 ft. c. to c. and supported by four lines of similar wide-flange longitudinal beams and the original wrought-iron columns. Without the use of welding, a steel grating deck could not have been used; weight of a reinforced-concrete slab on this bridge would have been prohibitive.

With the use of welding, a wind truss originally built into the plane of the highway deck has been eliminated, and its responsibility now falls

upon the welded decking and floor system. This improvement accounts for a large portion of the overall saving in weight. Welded construction, in addition, permitted the erection of 1,350,000 lb. of structural steel without any shop fabrication, allowing the purchase of steel at mill prices.

Structural steel for the new floor system and deck is all ASTM serial A-7. Silicon steel was considered but was discarded because of poor weldability. Steel grating employed for the deck incorporates its own bottom form for concrete. Lightweight concrete, delivered by truck mixer to the point of placement, was used to fill the grating. The concrete contained a lightweight aggregate produced by burning shale to clinker and crushing the clinkers to size. Weight of the steel grating, without concrete fill, is 13.2 lb. per sq. ft. A fill of ordinary concrete is estimated to increase this weight by 42.3 lb. per sq. ft. With the lightweight aggregate used in the concrete on the Eads Bridge deck, the weight is increased by only about 28 lb. per sq. ft. above the weight of the grating alone.

Deck replacement operations

Contract for the erection was awarded on a cost-plus basis to William J. Howard, Inc., Chicago, and field operations began on June 10, 1946. Work of burning old beams and welding new ones in place was started in the center span on the downstream side and was prosecuted toward both ends simultaneously, returning on the upstream side.

It was required during construction that two lanes for highway traffic be kept open without interruption and one railroad track be live at all times and the other one live except during working hours. These requirements were met, and the reconstruction of the upper deck and floor system caused but few minor delays to highway and railroad traffic.

Delays in delivery of steel prevented scheduled completion of the work by Jan. 1, 1947, but the job was finished and the contractor released on April 22. Concreting of the entire vehicle deck was completed and the four lanes were open to traffic March 17, 1947.

All longitudinal beams were erected continuous for the full length of the spans by butt-welded splices,

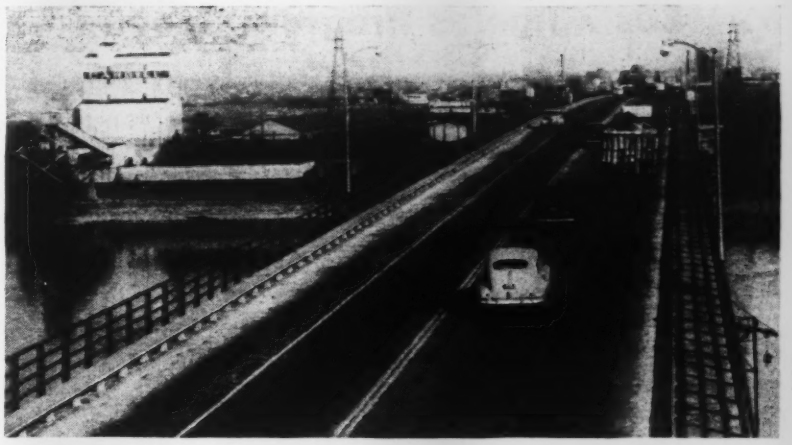


Fig. 5. The new deck has better grades than the old one due to being lowered 39 in. at the center and raised 9 in. at each end.

Fig. 6. The new deck has in no way detracted from the gracefulness of the Eads Bridge which has been a St. Louis landmark for 73 years.

and likewise the floorbeams were erected continuous for the full width of the bridge by butt-welding those that could not be erected in full lengths, with 100-percent penetration obtained by welding both sides of the joint. In general, two passes welded each joint, usually a $\frac{5}{32}$-in. stringer bead followed by a $\frac{5}{32}$- or $\frac{3}{16}$-in. cover pass.

Nearly all welding on the job was standard $\frac{1}{4}$-in. fillet, requiring two passes. Coated welding electrode was used throughout. At the peak, the job operated nine welding machines, eight 300-amp. and one 400-amp. The maximum employment was about 90 men, working on one shift.

Total cost of the reconstruction, less $40,000 salvage value of materials removed, was $392,000, of which 71 percent represents construction cost. No separate record was kept of welding cost. Quantities of materials involved were: 1,345,000 lb. of structural steel; 941,400 lb. of $4\frac{1}{4}$-in. roadway grating; 45,000 lb. of 2-in. sidewalk grating; 850 cu. yd. of lightweight concrete, and 425 cu. yd. of structural concrete. Carnegie-Illinois Steel Co. supplied steel and grating.

The engineering work was performed by the engineering department of the Terminal Railroad Association, of which H. Austill is chief engineer, L. T. Casson, bridge engineer, and N. J. Law Jr. assistant bridge engineer. For William J. Howard, Inc., contractor, Chicago, Steve MacEachern was field superintendent, under A. S. Burns, general superintendent.

Los Angeles Program Speeds Reconditioning of Cast Iron Pipe

R. E. Hemborg
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Los Angeles Department of Water and Power

Contents in Brief—Cast iron pipe removed from water service because of revisions of street grades or the necessity for larger lines, is reconditioned for reuse in the Los Angeles system by a relatively simple process. The pipe is hand scraped, grit-blasted, mortar lined, and then coated with a coal-tar paint.

SHORTAGE of cast iron pipe has led the Los Angeles Department of Water and Power to maintain an active program of reconditioning pipe for reuse in new locations. Although occasions for removal of pipe arise rarely, each length is carefully handled to insure long future use. During the past twelve months some 16,000 ft. of cast iron pipe has been salvaged by the department.

First step in the pipe removal operation is to break the pavement and then excavate by means of a trencher to just above the pipe level. Additional excavation is performed by hand and the pipe lifted out in sections by means of a truck crane. The joints, which are sealed with lead and oakum are separated by melting the lead with an oxy-acetylene torch.

The pipe is then taken to the water department's yards where it is hand scraped both inside and out to remove accumulations of dirt, rust, and tubercles. Next it is grit-blasted and it assumes a foundry-fresh condition.

Such careful cleaning is required because the pipe was unlined and uncoated when originally installed, except for a thin coal-tar wash to retard rust during transit and storage. Consequently some pitting is in evidence both inside and out and the pipe must be cleaned to fresh metal.

Next step in the reconditioning process is to line the pipe with cement mortar. This lining is placed by means of a machine devised by department engineers which uses an extrustion process. The mix consists of equal parts by volume of portland cement and sand with a water-cement ratio of some 3 gallons per sack.

The mortar is moved mechanically from a mobile hopper through a closed tube to the extrusion nozzle. A semicircular spring-steel trowel is attached to the nozzle.

The pipe is revolved very slowly while the nozzle is inserted in the pipe, traveled the full length and retracted; mortar is applied at a constant rate through both directions of travel. As soon as the nozzle is withdrawn the rotating mechanism is speeded up to create a peripheral velocity of approximately 1,500 ft. per min. for a period of two minutes. This rapid rotation serves to assure even distribution of the mortar and give it a smooth surface.

Canvas caps to retain moisture and thus aid curing are applied immediately after the pipe is rolled from the spinning machanism. The pipe is stored on racks under a roofed area for a period of two days during which time the new mortar lining is wet down twice daily. On the third day the pipe is released for stacking in the storage area.

Before being taken to a job, a thin coal-tar base paint is applied to the outside of the pipe. This serves to prevent rust after the grit blasting and also offers a small degree of protection in moderately corrosive soil.

When finally installed in a new location, the pipe is in better condition than when originally installed many years ago. Long service is expected as the result of the careful reclaiming procedure.

Samuel B. Morris is general manager and chief engineer of the Department of Water and Power, City of Los Angeles. The pipe reconditioning work is under the direction of E. W. Breitkreutz, engineer of water distribution and the author.

Fig. 1. Removal of pipe for reconditioning and use in another location.

Fig. 2. Said to be in better condition than when it was first installed. The reclaimed pipe goes back into service.

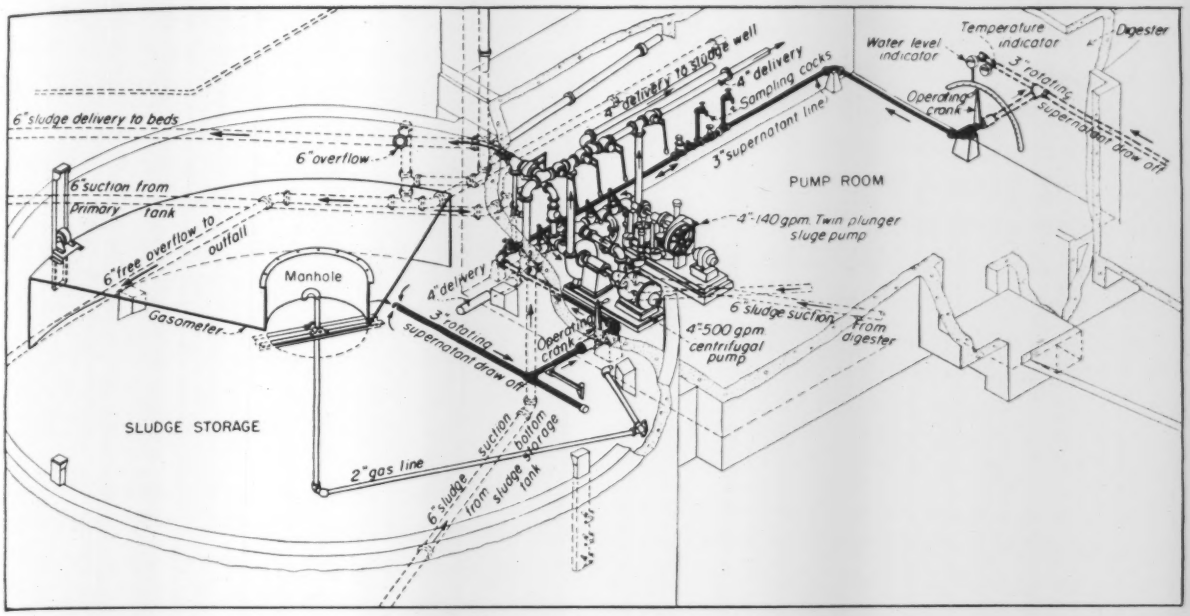


Fig. 1. Piping layout for the use of rotating supernatant draw-offs in a sludge digester. The arrangement includes suction inlets at the ends of 10-ft. radial arms giving a 20-ft. vertical withdrawal range; operating cranks in the pump room, centrifugal and plunger pumps, indicators equipped to show tank temperatures at inlets, sampling cocks, and discharge piping designed for flexible plant operation.

Rotating Drawoffs For Sludge Liquor

Contents in Brief—Rotating supernatant drawoffs in digester and sludge storage tanks not only permit withdrawal of liquor from any point in a 20-ft. vertical range but also are used to locate the surface of deposited sludge as well as the bottom of the scum blanket. Sectional temperature measurements are made simultaneously by means of a bulb fixed near the inlet and connected to an indicator gauge in the pump room

ROTATING supernatant drawoffs in the digester and sludge storage tanks of the Rocky River-Fairview-Bay Village (Ohio) sewage works not only permit withdrawal of supernatant liquor from various elevations but also serve as "feelers" to determine depth of sludge as well as the bottom of the scum blanket. Tank temperatures are measured by means of a stainless steel, vapor-tension, thermometer bulb. This device is attached near the inlet extremity of the rotating arm and connected by means of flexible stainless steel tubing to an indicator gauge on the pump room wall.

Made of 3-in. extra strong galvanized steel pipe, each drawoff as shown in Fig. 2 consists of three main parts: a 10-ft. radial withdrawal arm counterbalanced by a five-ft. length of pipe filled with lead: a 3-in. horizontal pipe shaft supporting the extended arms from a tee, passing through the tank wall in a 4-in., 24-in. long, grease-lubricated, thread-packed sleeve, and connecting to a 3-in. flanged expansion joint in the pump room which permits rotation; and a two-ft. crank attached to the flange of the 3-in. shaft, the free end of which moves along a semi-circular position-indicator plate. Fitting into notches on the inner circumference of this plate, a lug on the crank handle fixes the location of the rotating inlet in the tank. Each notch is marked with corresponding elevation of the inlet.

The rotating drawoff is designed so that, when the crank handle is exactly vertical, the inlet arm is horizontal and draws from El. 13.5 When the crank is at the right-hand extremity of the position indicator, the rotating inlet sucks from the lowest point in the tank, El. 3.5, and at the left hand, from the highest level, El. 23.5. Thus the vertical range of withdrawal is 20 ft.

In operating the device, precaution must be taken as to the position in which the drawoff arm is left after use. If left upward, the inlet may become clogged with scum, and if downward, it may become fouled with sludge, should the sludge level rise too high in the digester.

Rotation in expansion joints

To deliver liquor to any desired point in the plant or to sample liquor from any elevation in the tanks, the 3-in. rotating horizontal pipes are connected through expansion joints to suction headers leading to a 4-in., 500 gpm. centrifugal and a 4-in., 140 gpm. twin plunger pump (Fig. 1).

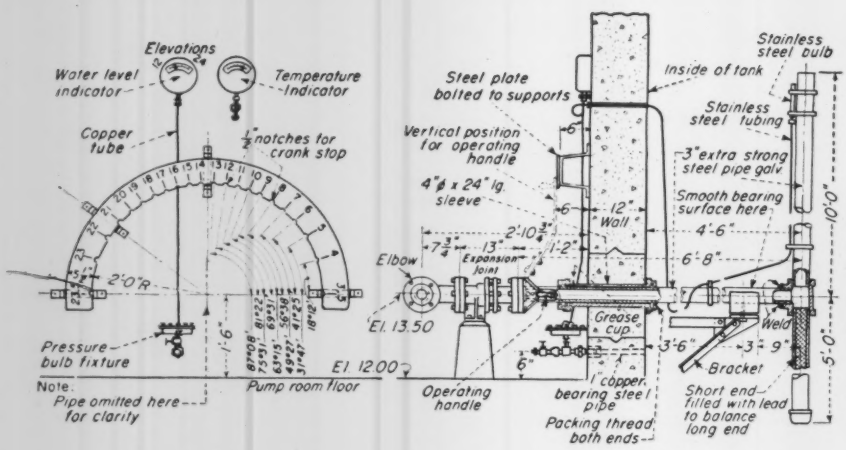


Fig. 2. Counterbalanced by a five-ft. arm filled with lead, the 3-in. 10-ft., rotating arm is connected to suction piping in the pump room through a grease-lubricated sleeve and expansion joint.

Fig. 3. The rotating arm within the tank is positioned manually from the pump room by means of a two-ft. crank.

The discharge piping is fitted with the necessary valves and connections to provide full flexibility of operation. Sampling cocks are included.

Liquor temperature is measured

The temperature indicator as well as the water level gauge is located in the pump room directly above the position-indicator, thus permitting quick correlation of measurements with the location of the inlet. Connected to the water-level gauge by means of copper tubing, the pressure bulb fixtures, also in the pump room, are actuated through a one-inch copper-bearing steel pipe passing through the concrete wall into the tank.

In both installations, no leakage has developed either through the sleeve or the expansion joint. An injection of grease in the sleeve every two or three months maintains its watertightness.

Operating experience indicates that a slight improvement may be made in the crank. Fabricated from a ¼- x 2-in. bar, the handle is too flexible. Furthermore, sensitivity of feeling for scum and sludge levels would be increased and manual operation would be made easier, it is reported, if the handle were lengthened 6 or 12 in.

The rotating drawoff was conceived and designed by W. F. Schnickler, formerly assistant engineer with the Cuyahoga County Sanitary Engineering Department and now sanitary engineer with Jones and Henry, consulting engineers, Toledo, O. From plans prepared under the general direction of Samuel F. David, former county sanitary engineer, the plant was built as a WPA project, and construction was supervised under the direction of Frank L. Woodruff, present county sanitary engineer.

How Street Cleaning Can Be Improved

Improved municipal cleanliness and appearance can be accomplished throughout the United States if existing ordinances that prohibit littering of public and private space and regulate disposal of refuse are made effective by adequate enforcement. This fact was brought out by William A. Xanten, superintendent of city refuse, Washington, D. C. in a paper presented at the fourth International Conference on Public Cleansing recently held in Amsterdam, Holland.

Street cleaning, Mr. Xanten pointed out, is becoming more complicated and more expensive because of the increasing amount of debris that accumulated in streets and alleys. In addition, this work is hampered by traffic congestion and curb parking.

One difficult problem to cope with is slum-area streets. In most cases, frequent cleaning has not succeeded in correcting general unsightliness. A greater problem—outside the street-cleaning function but closely related to it—is the lack of sanitation on private lots. The effect of a good cleaning job done on public space is nullified by such conditions. Expressing the hope that slum clearance will aid this situation, Mr. Xanten declares that much education and widespread enforcement must be applied in addition to regularized street cleaning.

An effective program, recently launched in Washington, D.C. was a police precinct-by-precinct drive on a year-round basis. The most unsightly city blocks were listed. Various agencies were then directed to concentrate their efforts on these areas so that the entire city was covered in a year. The campaign keynote was enforcement of existing ordinances. Occupants of premises responsible for infractions were compelled to do much cleanup work.

As added features, rat and weed control measures were coordinated with thorough cleaning and spray-disinfection of public space.

Refuse collection must be efficient

The efficiency with which refuse collection is handled is a factor in the appearance of a community. Containers along curbs result in low collection costs but too often cause unsightly conditions. Moreover, in many

municipalities, the city forces do not collect refuse from businesses or industries. Private contractors or the establishments themselves handle this material. From a street-cleaning standpoint, rigid control of these activities must be exercised by the municipality. Unless this is done, irresponsible dumping and improperly maintained land fills result, Mr. Xanten says.

Refuse-disposal sites within reasonable truck hauls are becoming scarce. This is a serious problem for large cities.

In Washington, a transfer station for bulk handling of incinerator refuse, ashes, and non-combustible street sweepings has been designed. It will house railroad cars and truck trailers and include odor and dust control devices.

In this building collection units will dump refuse directly into gondolas or 30 cu.yd. trailers for shipment to landfills located in suburbs. This structure is scheduled for erection in 1948.

Leaf disposal in Washington amounts to nearly 80,000 cu.yd. per year. At present about 30,000 cu.yd. of leaves are being stockpiled to provide compost for the National Capital Park Service. The city is urging house-holders to follow this practice.

New methods and procedures

Slum-area alleys are sprayed with DDT during the summer to combat insects. Approximately two miles per day are treated using truck-mounted equipment. DDT is also used for tree spraying, mosquito control in sewers, and for eliminating flies at incinerators, sewage pumping stations, tool houses and landfills.

Weeds are controlled, Mr. Xanten reports, by spraying with 2,4D (*Dichloro-phenoxyacetic acid*). This is more economical than cutting. One three-man crew can treat 4 to 12 acres per day. Improvement in municipal appearance and relief for hay-fever sufferers result.

Mr. Xanten recommends that cities spray unimproved lots on an assessment system, the small cost to be charged to the owner and collected with the property tax.

Handling refuse at public markets by means of removable truck bodies is being used with increasing success. One truck will handle a number of units particularly where haul is short.

A uniform method for reporting street cleaning data is needed. The difficulties of obtaining accurate, unit costs for the various types of work are a strong argument against including such information in a standard report. Mr. Xanten suggests that a form for recording fundamental data readily that would reveal the scope and total cost of street cleaning operations could be adopted. A comparative statement of such work for Baltimore and Washington included here is a type of report that furnishes essential information without unit costs. However, it is not as comprehensive as the standard form should be and includes no snow-removal data.

STREET CLEANING DATA FOR BALTIMORE, MD. AND WASHINGTON, D. C.

	Baltimore (Cal. Year 1945)	Washington (Fiscal Year 1946)
Special Conditions	Industrial Areas Water front (shipping)	Wide Streets Tree Population (130,000 on curb)
Population	930,000	912,000
Area (Land)	91 sq.mi.	61 sq.mi.
Mileage of Streets (cleaned by forces below)	1,000 mi.	900 mi.
Mileage of Alleys (cleaned by forces below)	400 mi.	387 mi.
Est. Quantity of Sweepings (annually)	39,600 tons 132,000 cu.yd.	80,580 tons 241,741 cu.yd.
Disposal:		
By incineration	0%	5%
By dumping	100%	82%
By composting, etc	0%	13%
No. of Street corner receptacles	600	920
Supervisory Force (Foremen, Overseers, etc.)	50	21
No. of "white wing" patrolmen	34	155
No. of laborers on gang work, etc.	275	129
No. of truck and equipment operators (inc. flushers)	47	68
No. of trucks operating	47	51
No. of flushers operating	7	12
No. of sweepers operating	4	0
No. of other equipment (horse-drawn, miscl.)	None	6 leaf-loaders*
Max. Frequency of Cleaning (downtown)	6 times daily, once at night	6 times daily (2 shifts—16 hrs.)
Max. Interval of Cleaning (suburbs)	6 weeks	4 weeks
Wage rates (hourly) laborers	96 ¢	84 ¢
Drivers	$1.00	$1.00
Length of Work Week	48 hrs.	40 hrs.
Wage benefits—holidays	7	8
vacation	2 weeks**	26 days
sick leave	6 days	15 days
Total annual cost (inc. Admin. & Equipment Maint., etc.)	$1,103,680	$831,154

* Snow loaders equipped with leaf buckets (wheeled-tractor, hydraulic-lift type).
** After one year of service.

Incinerators Include Agitation and Hot Air

Work on a new $345,000 rubbish incinerator for Beverly Hills, Calif., is now being completed according to E. V. Tait, engineer for the Nichols Engineering & Research Corp., New York general contractors for the job. It is expected to handle 100 tons of debris per eight hour shift.

A feature of the Nichols incinerator is a revolving cone with arms on the floor of the furnace to agitate burning rubbish. Preheated air from the combustion chamber is forced into the burning mass through holes in the cone and arms. Agitation and hot air are said to insure even and complete burning in the furnace.

Twin furnaces and combustion chambers, approximately 14 ft. high and 13 ft. in diameter, make up the unit. Short passages, 5 ft. high, join the tops of the furnaces and combustion chambers. A 30-ft. long and 10-ft. high duct leads from each combustion chamber to the filters. The fan-equipped passages lead from the filters and join before entering the single 110-ft. high smokestack.

Mechanical details include a stoking arrangement that will deliver rubbish fed at ground level into the top of the furnace; the revolving cone, the ash-dumping system, including a belt conveyor to elevate the ashes to dump trucks; and conveyors that facilitate gravel removal from filters.

Fig. 1. Steel pipe, 67 and 68 in. in diameter, is used for most of the construction on the Second Mokelumne Aqueduct.

Water Supply Job Follows 1924 Plans

Contents in Brief—Construction of the Second Mokelumne Aqueduct in California follows closely a plan of water supply development laid down more than two decades ago. Construction on the pipeline is similar in general nature to that done on the original line which was completed in 1929, but improvements in field welding techniques and in steel-pipe coating and lining procedures assure a better job at this time. The new aqueduct will bring some 200 mgd. of water from the Sierra Nevada to the East Bay Municipal Utility District.

DEMONSTRATING that plans of development, if carefully engineered, can hold valid over a long period of years, the building of the Second Mokelumme Aqueduct uses as a guide a development plan worked out in the early '20s. Minor changes necessary to adapt the work to improved techniques include welded rather than riveted joints and concrete lining and coating instead of asphalt enamel lining and felt wrapping. However, the necessity for additional supply facilities as well as the routing and timing of the construction are almost as originally contemplated when the plan for supplying the East Bay Municipal Utility District was worked out by the late Arthur P. Davis, then chief engineer of the district.

Work now under way consists of the installation of a new steel pipeline paralleling the existing Mokelumne Aqueduct that brings water to the district from the Sierra Nevada. This aqueduct, completed in 1929, is 93.85 mi. long and consists of 9.14 mi. of tunnel, 81.16 mi. of steel pipe and 3.55 mi. of concrete pipe. As the system is designed for an ultimate capacity of 200 mgd., tunnels and other such structures were built to accommodate this amount. Capacity of the original pipeline is 42 mgd. under gravity flow; with the installation of two booster pumping plants this has been increased to some 95 mgd.

To meet increasing demands in the district, which comprises Oakland, Calif., and nearby cities and unincorporated areas, a parallel pipeline has long been planned. The existing line at the present time is barely able to supply demands that for the 1946–47 fiscal year amounted to 104 mgd. This is greater than the aqueduct capacity, some 20 mgd. being provided from local sources that are dependent on seasonal rainfall. A series of dry years could quickly deplete the local resources and leave the area with insufficient water. Thus, the need for a parallel aqueduct.

To finance this work a bond issue of $12,000,000 was authorized by the voters in the November, 1946, elections. Total cost is estimated to be some $21,700,000. To the extent that the cost of the line exceeds revenues from the bond issue, monies from other district sources, including current income, will be applied.

Construction follows 1924 plan

Construction of this Second Mokelumme Aqueduct follows a plan developed in 1924. In accordance with this, a 65-in. pipeline was built from Pardee Dam in the Sierra Nevada to the district proper. Capacity of this line under gravity flow is 42 mgd. This plan called for the installation of a pumping plant near the end of the line (Walnut Creek pumping plant) to boost the capacity to 67 mgd. Next step on the early plan was the construction of a parallel line to operate under gravity flow. When required,

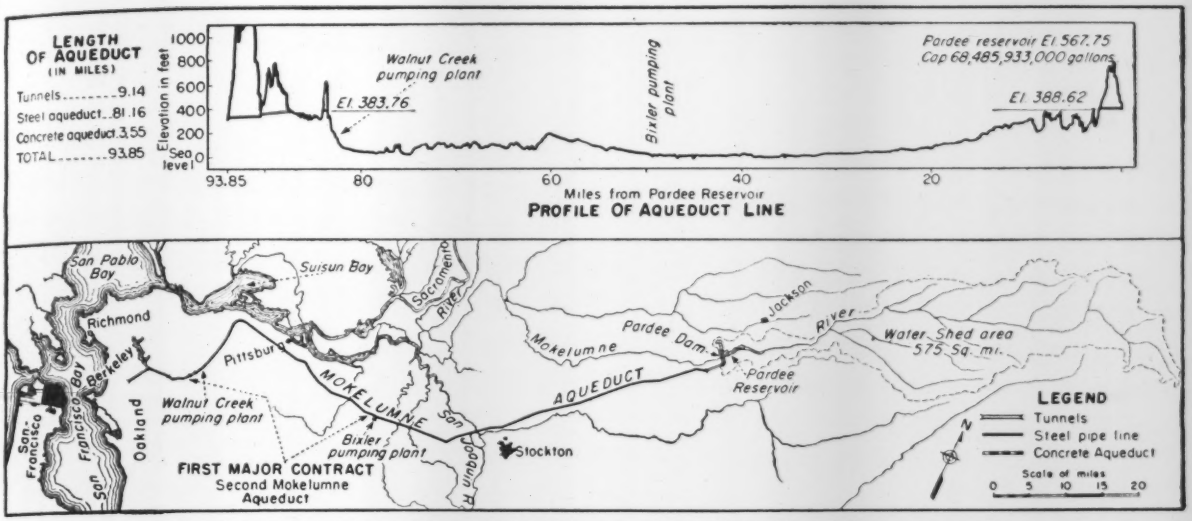


Fig. 2. This location map shows the Mokelumne system and location of the current work.

additional pumps were to be added at the Walnut Creek plant.

Essentially, this is the plan now being followed. However, during the war the water demand increase was rapid. The installation of the parallel line which Mr. Davis predicted would be required in 1943 was unpracticable because time was short and steel could not be spared for such construction. Accordingly, a pumping station was installed at Bixler, Calif., which increased the capacity of the line to some 95 mgd. (*ENR* Sept. 5, 1946, vol. p. 310).

The Bixler pumping plant is the only part of the work to date not in accord with the original plan. When the new line is completed and the distribution reservoirs are again filled, this plant will be shut down and kept for standby purposes only. The saving in operating costs, mostly due to cost of power for pumping, is estimated to be $360,000 a year.

An idea of the growth which prompted the building of Bixler plant and the parallel line can be obtained from the following table:

Year	Avg. Consumption
1940-41	46 mgd.
1941-42	53
1942-43	68
1943-44	86
1944-45	100
1945-46	106
1946-47	104

Most of the increase can be attributed to the influx of population and industry due to the war. The slight recession in consumption during the last fiscal year is due to curtailment of wartime industrial activity. This decline, however, is not as great as was expected. In fact, domestic water consumption has increased in all parts of the district since the war ended; even in Richmond, Calif., which had the largest wartime increases. Steady increase in consumption is expected in the future.

Growth is further attested to by number of meters in service. Figures for some recent years as of July 1 follow:

Year	Meters in Service
1941	154,493
1945	177,728
1946	182,932
1947	188,773

Capacity of the ultimate development of the Mokelumne system is 200 mgd. This figure is set by state permit and is conservative estimate of what the watershed will develop. Thus, with some 20 mgd. available from local sources, the district has available a capacity of 220 mgd.

Surplus pipe starts construction

The first step in constructing the parallel line was the installation of 6,600 ft. of 60-in. steel pipe. This was war surplus material originally intended for use in the Manila water system, and has a steel shell $\frac{5}{8}$ in. thick, much heavier than actually needed. The new line was originally intended to be 67 in. for its full length. Because of the relatively short (just over a mile) length of 60-in. pipe, part of the rest of the line has been increased to 68 in. so that resultant flow through the system will be equivalent to flow through a 67-in. pipe.

Work now under way consists of the installation of some 30 miles of 67-in. and 68-in. pipe. Additional contracts will be let as soon as local contractors are able, in the opinion of district officials, to assimilate more work.

Steel cheaper than concrete

Bidders on the current work were allowed two alternatives, either steel or concrete pipe. The bid on the steel pipe work was taken in two parts, one for fabricating and supplying the pipe, and one for installing it.

The Western Pipe & Steel Co., of California entered a bid for $4,508,532.45 for supplying the pipe at the job-site. Low bid for laying the pipe was $1,952,622 by P. & J. Artukovich, Los Angeles. These total $6,461,154.95 and were the successful bids. They compare with the low bid of $6,879,950.10 for concrete pipe submitted by the American Pipe & Construction Co.

All joints and other connections on this work are welded; whereas the original line was shop-welded and field-riveted. An attempt was made on the original line to use welded joints, but because welding techniques had not advanced far enough this was abandoned in favor of riveted joints (*ENR* Dec. 2, 1926, p. 912). Butt-welded joints with no steel lapping over were tried on the old work, but much difficulty was experienced with parting under welding

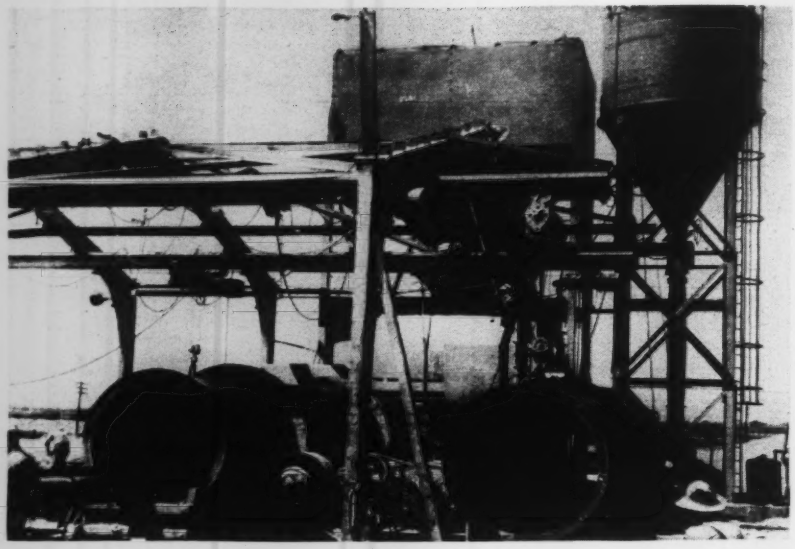


Fig. 3. A spun mortar lining is being placed in the pipe on the left in this specially built plant. Rings clamped around the pipe and inserted in the ends help maintain the circular section during this process.

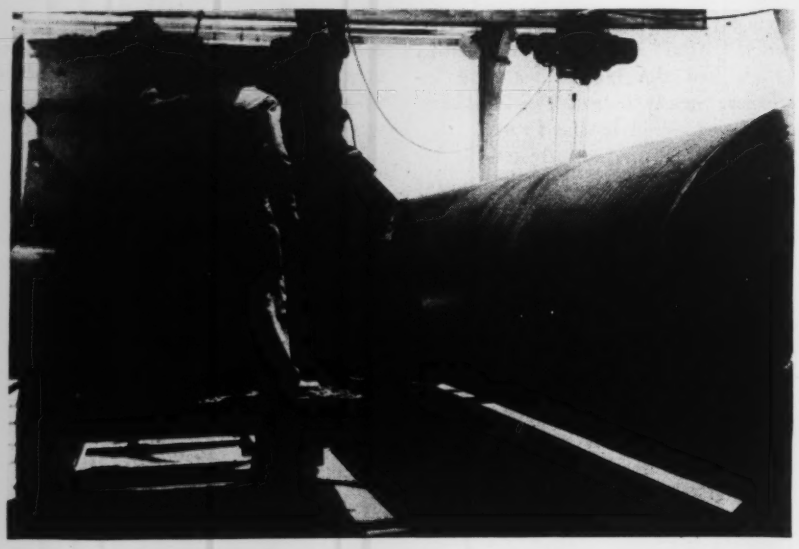


Fig. 4. Mortar coating is shot on the pipe by means of counter-rotating brushes as the pipe is slowly revolved.

stresses. With the improvement of electric welding techniques and the use of a bell and spigot type joint, there seems to be no question about the adequacy of welding on the new work. All field welding is done with electric welding machines.

Manholes on the line are one-half mile apart. However, for installation purposes the contractor is permitted to cut access holes at intervals of not less than 1,000 ft. This permits mass production techniques to be used on the field welding, as many as 34 machines being used on the job at one time.

Mortar replaces enamel lining

The new line has a steel shell varying in thickness from $\frac{3}{8}$ to $\frac{1}{2}$ in., depending on the head. It has a spun-cement mortar lining and the outside is wrapped with $\frac{1}{4}$-in. wire and then coated with mortar. Net inside diameter after lining is 67 or 68 in., depending on location.

The original line was felt-wrapped and had an asphalt lining and coating. Specifications for the current work called for centrifugal lining with cement mortar. While this process is not new the contractor points out that it has not been common practice to use centrifugal lining methods for steel pipe this large. Among other things it was found that the steel shell was not rigid enough to maintain a perfect cylindrical shape —it flattened out due to its own weight and assumed an oval section. Accordingly, two stiffening rings are clamped around the pipe, spaced equidistant from the center of the 30-ft. lengths as can be seen in the accompanying illustration. In addition to this, other stiffening rings are forced in each end of the pipe. These end rings serve not only to maintain the shape of the pipe but also to constrain the mortar.

Coatng is sprayed on

The mortar coating adopted is the American Pipe & Construction Co.'s "brush coat" (*ENR* Dec. 16, 1943, vol. p. 896). In this system, the pipe is first wrapped with a $\frac{1}{4}$-in. rod under a 500-lb. tension. The mortar coating is sprayed with great force on the pipe by means of counter-rotating brushes so arranged that the mortar impinges upon the periphery of the pipe at a right angle as the pipe is rotated. A mix of 1 part of cement to $3\frac{1}{2}$ parts of carefully selected and graded sand is used for this coating, but the important quality is moisture content. A very dry mix (0.37 parts of water to 1 part of cement by volume) is used so the mortar will not sluff off the pipe. The coating is three-fourths of an inch thick which leaves a net of $\frac{1}{2}$ in. at the wire rod. For a 30-ft. length pipe, some $1\frac{3}{4}$ cu.yd. of aggregate is required.

The American Pipe & Construction Co. has a subcontract to line and coat the steel pipe and has erected a plant for this purpose at Pittsburg, Calif. To date, the maximum number of 30-ft. lengths coated and lined in two 8-hr. shifts has been 42. Delivery schedules set up for the job require the completion of 900 ft. a day or some 30 pipe.

John S. Longwell is chief engineer and general manager of the East Bay Municipal Utility District and the aqueduct work is under the direction of E. L. Macdonald, engineer in charge, Mokelumme Division.

Screw Piles Support Turkish Pier

More than 400 poured-in-place reinforced concrete piles equipped with a special helical tip were screwed into the hard sand bottom of the Gulf of Alexandretta to support the outer end of a long pier built at this Mediterranean port by the Turkish government during the recent war. Of British design and known as Braithwaite-type, the piles were 42-in in dia. and varied from 20 to 65 ft. in length. Designed for a 250-ton load, each pile was screwed some 15 ft. into the sand bottom. About an hour was required to secure the proper penetration for each pile.

The possibility of speedy construction was one of the principal reasons for adopting this type of pile, according to an article in the French magazine, *Travaux*. Turkey was fearful that the Germans might block their principal northern ports of Istanbul and Izmir. Alexandretta, near the country's south border, would be available in that event, but its small, dike-protected harbor could handle only shallow-draft boats. The decision, therefore, was taken to build a new pier, or mole, outside of the old harbor, and long enough to reach deep water. To assure its rapid completion, the screw piles were adopted, and in addition a precast concrete design was selected for the superstructure. The beams and deck members were cast while the foundations were under way, and were quickly installed as the pile work was completed.

The pier has a total length of 1,700 ft., consisting of 300 ft. of fill at the shore end, a 700-ft. access viaduct 40 ft. wide, and 700 ft. of mole proper, 160 ft. wide. Deep draft ships can tie up to the mole, while those of shallower draft can be accommodated alongside the viaduct.

The piles are composed of three parts: (1) a reinforced concrete tip; (2) the steel screw; and (3) a $\frac{1}{8}$ in. steel pipe shell, horizontally corrugated, that serves as a form for the concrete. In addition, a steel pipe with a 1-in. wall thickness is temporarily inserted inside the pile shell to serve as the rotating shaft for screwing the tip into the sea bottom.

As shown in the accompanying illustration, the reinforced concrete tip is 4 ft. long and about 37 in. in dia. where it joins the steel screw. The latter is a steel casting equipped with two helixes which attain a diameter of 8 ft. The pile shell is welded to the top of this screw body, while the rotating pipe is screwed into it for easy removal after the pile has reached its maximum penetration.

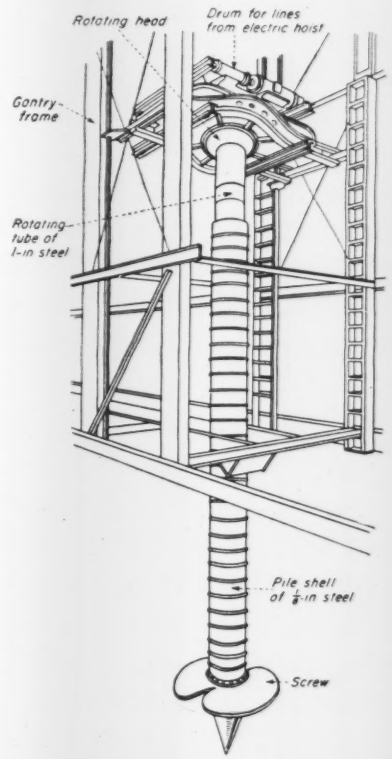


Fig. 1. Screw pile mounted in the gantry frame that was used for installation. After screwing the point to proper penetration, the rotating tube was removed and the shell filled with reinforced concrete.

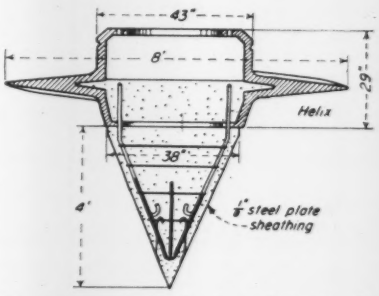


Fig. 2. Detail of pile tip and screw. Assembled in this manner, the unit weighed about 5 tons.

To install the piles a gantry about 100 ft. wide and, therefore, covering about 7 pile locations (pile spacing 15 ft.) was used. Lines from an electric hoist on top of the gantry rotated a special head that was bolted to the top of the rotating pipe in each pile. As soon as one pile was "driven," the rig was moved to the next one. Concreting of the pile shells followed closely behind.

Circular Grit Chambers Used in Germany

Two types of circular grit chambers used in German sewage disposal plants are described in a report now on sale by the Office of Technical Services, Department of Commerce. The report was prepared by OTS investigator G. N. Onrsen, consulting chemist of New York City.

One type, called the "Blunk grit chamber", consists of a tank with a cylindrical upper part and a hopper-shaped bottom. The sewage enters in a downward direction through a vertical central tube extending about half way down the grit chamber. At the outlet of the tube, the heavy suspended matter continues downward, while sewage with lighter suspended matter reverses its flow, travels upward and overflows. The special feature of the Blunk chamber is an arrangement consisting of a number of concentric annular submerged walls around the central inlet tube with equal cross sectional spaces between each pair. The design causes almost constant upward movement of sewage regardless of rate of flow.

The other type, called the "Geiger grit chamber", also of circular construction, employs a different principle. It passes sewage into the grit chamber in a tangential direction the flow passes along the inner circumference of the chamber and discharge's after having completed a little more than one-half turn.

The Blunk chamber seems best adapted to plants with widely changing rates of flow, the report states. The Geiger construction serves for all conditions but is probably less applicable to conditions involving large fluctuations. The Geiger installation requires less space and excavation.

Fig. 1. Floor-dump storage and furnace feeding in incineration plants create unsightly and unsanitary conditions.

Refuse—In and Out of the Incinerator

Henry W. Taylor
Consulting Engineer, New York, N. Y.

***Contents in Brief**—Pointing out that use of the floor-dump storage and feeding method not only creates unsightly and unsanitary conditions at incinerator plants but also adds to labor costs, the author suggests that industrial equipment be adapted to the handling of refuse. Specifically recommended is the inclusion of storage pits, monorail motor-driven trolleys and single-line buckets in average-size plants. Moreover, to preclude complaints resulting from ash odors, suitable quenching, adequate facilities for removal of residue, and proper residue withdrawal procedures are urged. One method illustrates the use of a hydro-jet for transfer of ash.*

NOT so many years ago there were two principal classes of incineration plants: (1) pit-and-bridge crane and (2) floor-dump. Use of the pit-and-bridge crane type was reserved for the few large plants while the floor-dump method of charging was adopted extensively in small communities.

Every engineer and every manufacturer specializing in this field has built floor-dump plants and has had an opportunity to see them in operation, and that seeing should be enough. The writer feels that this type of design should be discontinued and remodeling of old installations should be initiated to effect more efficient operation.

Most average-size communities cannot afford an incinerator plant equipped with a pit and bridge crane. That is a well-known fact. However, there are other designs which incorporate up-to-date, inexpensive materials-handling equipment that can be adapted economically to this type of plant.

The writer's first attempt to draw away from the floor-dump plan for a small plant was made at Larchmont, N. Y. Here, two large steel skips extending below the charging room floor were installed to receive refuse directly from the discharging trucks (Fig. 2). Hinged at one end, these skips are mechanically elevated by means of cables and drum hoists. Two electric motors, connected to a common drum shaft, supply the necessary power. In effect, a stationary dumping truck, each hopper can be raised as desired to charge the furnace. Thus, one operator can feed two 60-ton furnaces without pushing, hauling or raking the refuse on the charging floor.

This method is limited by a lack of capacity, each skip holding about 35 cu.yd. When only one unit is in operation, the skip may be full and the use of the out-of-service unit required. Or, if discharging, the hopper must be lowered to serve the next

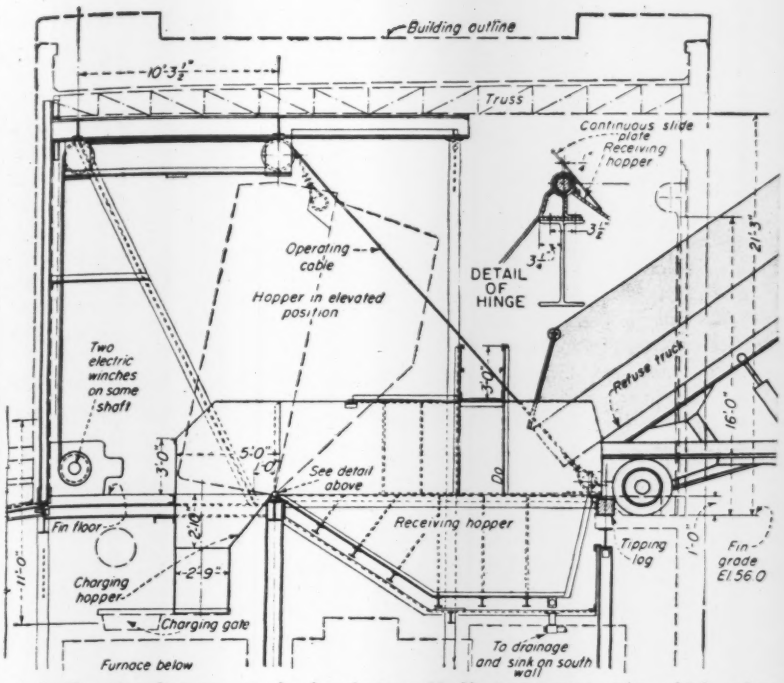


Fig. 2. Elevating hoppers at the Larchmont, N. Y. incinerator, into which refuse trucks dump directly, eliminate floor-storage and floor-feeding.

truck. On the other hand, considerable savings in manpower and added plant cleanliness and safety result from the adoption of this system. A similar charging apparatus is being installed by other designers in a plant at Amsterdam, N. Y.

Single-line bucket charging

The next move to improve upon the floor-dump system was made in the plant at Darien, Conn. Here a pit, single-line bucket, electric hoist and motorized trolley were included. At that time there was no precedent for using this industrial equipment to handle refuse. Consequently, trolley and bucket speeds were held conservatively low though adequate capacity was provided. As a result of operating experience, these speeds now can be increased safely.

The bucket, hoist and trolley are controlled by means of four push buttons. No crane operator in a suspended cage is involved. In addition, the area of the charging room is minimized as space for material storage and truck turning is not needed. The width is made about equal to that of the refuse pit.

In a larger plant at Lyttonsville, Md., the designers have gone a step further and installed not only a monorail crane and two-line buckets but also facilities for floor dumping which provide for emergency operation during mechanical breakdown or power failures.

With bucket delivery the temptation to push excessive charges into a furnace, as in the case of the dump system, is avoided. In this design a definite strip in the charging room is allotted to bucket travel so that the operator's aisle is not subject to interference; and required headroom is less than that demanded by dumping trucks. This not only reduces roof clearance to a height less than that required for truck dumping but also renders roof and monorail support extremely shallow and simple. Such construction simplification coupled with minimum requirements for floor space tends to balance the extra cost of refuse-handling mechanization.

Further improvements possible

This general scheme and these specific designs for delivering refuse to the incinerator charging chute are not, of course, the final answers to the problem, but serve to indicate the trend—which is away from floor-dumping when the pit and bridge crane installation would not be financially feasible. It is hoped that modern demands, both sanitary and operative, will cause development of new ways and means and further adaptation of industrial equipment for proper handling of material at incinerators. Many of the older plants should be remodelled to include handling apparatus. In most cases this can be done readily without depreciating the value of buildings and equipment and at a cost that will be regained through operating savings.

Summarized, the advantages of the pit and monorail feeding system are: equalized feeding of refuse; and confined sanitary storage in a painted, washable pit from which refuse is handled mechanically. When equipped with two truck doors, the pits can be operated so that the first refuse to enter the pit is not the last burned. Occasional peak loads and late afternoon deliveries can be stored for burning the following day, thus avoiding costly overtime, permitting early firing and equalizing daily variations. Of course, this could be overdone as it is important that the pit be cleared and washed down at least every other day.

How residue should be handled

Proper incinerator charging is only half the problem. Residue must be quenched amply and removed efficiently. Thorough quenching takes time and there is no shortcut for the process. Ash removal can be a distinct nuisance and the *only* nuisance emanating from an incinerator.

At a recent hearing, an objector to an incinerator in his vicinity loudly attacked the success of one of the better existing plants by giving a vivid picture of steam and acrid odors escaping during periods of ash removal. The speaker mistakenly connected this nuisance with the process of burning refuse.

In a great many older projects, cleaning of fires is accomplished by drawing burned and semi-burned material onto the stoking room floor where it is quenched with a hose. In other plants, fires are cleaned through the furnace doors by raking into ash carts on tracks adjacent to the furnace front. This is done on the theory that steam from quenching will be drawn into the furnace and disappear. However, it often develops that these vapors and acrid odors are undisciplined and do not return to the furnace.

One answer to these conditions is a three-story plant. Here again, the cost of such an installation, which is sometimes questionable for the average-size project, must be considered. However, it is conceded that a three-story plant does not, in itself, avoid a residue nuisance. When fires are being thoroughly cleaned, the temptation is to minimize quenching time and deliver the material quickly through the ash hoppers and almost directly to the truck below. The writer is well aware of the difficulty of preventing such practice, on occasions at least. The solution probably lies in larger ash hoppers, more quenching water and training of the crew so that ash removal is continued throughout the day. In addition, space must be available in ash hoppers for a thorough cleaning without direct removal to the truck. Another solution is use of ash conveyors submerged in a trough of water or other hydraulic means where quenching is by submergence in water rather than by spray.

Adequate ash removal is being accomplished without the construction of a three-story plant, utilizing submerged conveyors and delivery to an elevated storage bin. This procedure requires only a basement underneath the furnace and an inclined conveyor to an elevated bin. The basement occupies but a small part of the total floor space of the stoking room. This arrangement was used at Schenectady, N. Y., where the cost of an ash tunnel was prohibitive. At Mamaroneck, N. Y., a similar design has also been used. The ash conveyor method, on a larger scale, has been utilized in many plants—notably at Providence, R. I., and Pittsburgh, Pa.

Where residue may be disposed of on the incinerator site, a narrow tunnel about 8.5 ft. high, in line with the ash hoppers, and equipped with ash cars and industrial track, may be built. The cars can be handled by means of a cable and electric winch while the industrial track can be extended or shifted, as required, to new dumping areas.

The three-story ash floor design can be modified to include ash rooms which form a third floor under a very small section of the building. In this case extra grading, ramps and wing walls are required to permit trucks to back into the lower level.

At Lyttonsville, Md., an hydraulic elevator has been incorporated to afford truck access to the ash room from the grade of the stoking room floor. At other plants, ash removal is accomplished by use of elevator skips which dump into an elevated ash bin. These designs eliminate the need for a full three-story structure.

At Darien, Conn., ash is quenched and conveyed by a hydro-jet to a central ash pit from which the drained ash is removed by the charging bucket. Other methods may be developed which would include a central wet ash pit and bucket removal and where either the charging bucket or a special bucket are used.

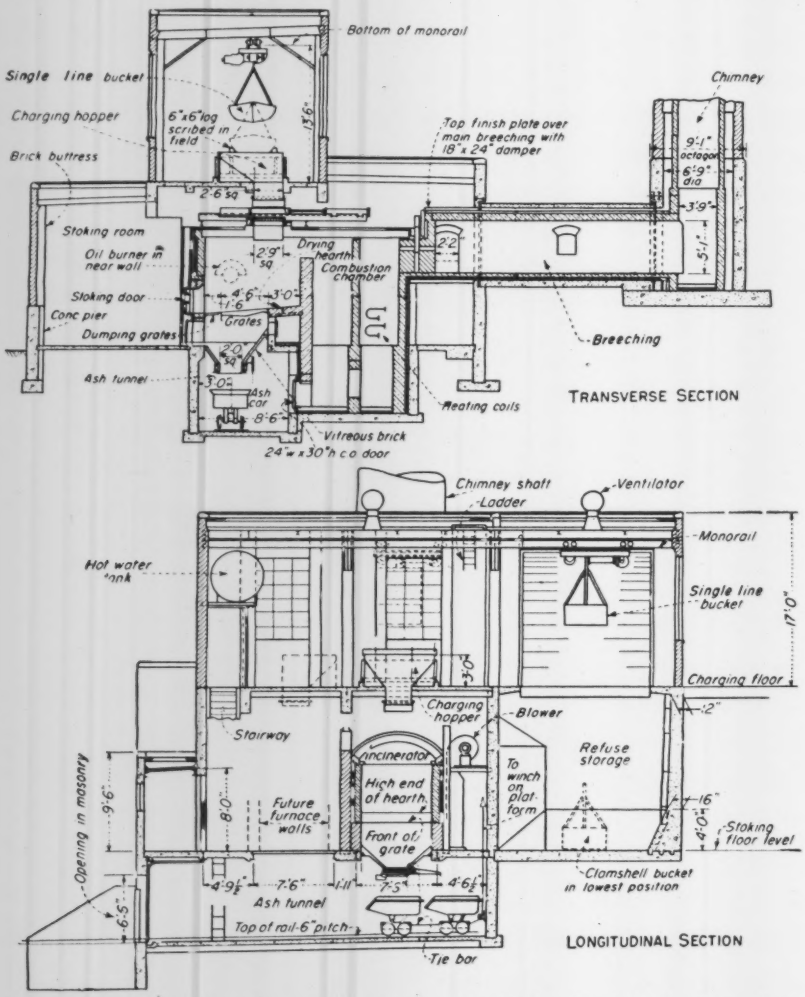


Fig. 3. Vertical sections through the proposed Cortlandt, N. Y. incinerator plant indicate how furnaces will be charged by means of a trolley, hoist and single-line bucket from a storage pit. Ash removal to a site dump is accomplished with gravity-propelled industrial cars.

Fly-ash collection

Adequate removal of the main residue from an incinerator or furnace is but a part of the ash problem. Heavy and light ash cannot be permitted to accumulate in combustion chambers. The basement layout and arrangement of combustion chambers should provide for delivery of secondary ash to the ash room directly. This idea has been incorporated in a recent design of this office, and will be used in future projects.

Fixed or portable vacuum systems have been used for removal of secondary residue from pre-heaters, expansion and chamber flues. The importance of regular cleaning of chambers and adequate facilities to do so warrant more design attention.

Under the impetus of a public sensitively alert to sanitary and operat-

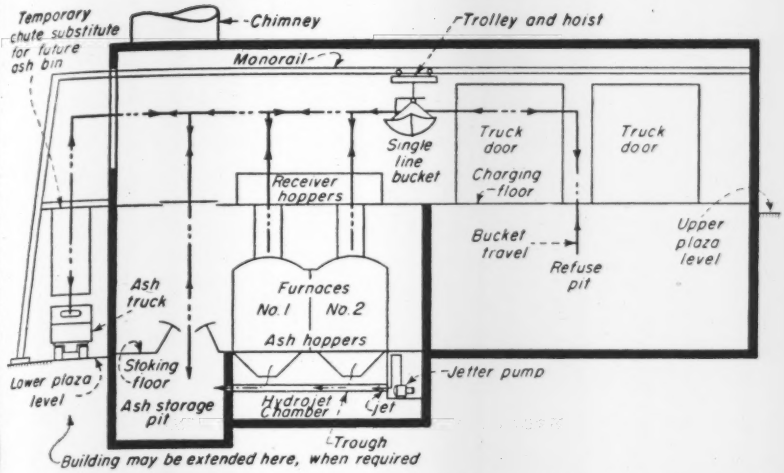


Fig. 4. Shown schematically, the incinerator at Darien, Conn. includes a single-line bucket used for both charging refuse and ash withdrawal. Residue is quenched and transferred to a storage pit by hydro-jet.

ing conditions, the modern design trend is to attack the twin problems of charging refuse and removal of residue by financially feasible mechanical methods. Also, there is a need for remodelling older plants, but reconstruction is more complicated and costly than inclusion of better methods in the beginning. It is the writer's opinion that these two material handling problems must be satisfactorily solved in order to meet the demands of the public, reduce operating and construction costs, and maintain progress in the science of incineration.

pH Scales May Be Standardized

As the wide spread use of different types of pH scales results in slightly variable values, the National Bureau of Standards is sponsoring the universal adoption of a single standard pH scale. To accomplish this purpose, evaluated samples—which can be utilized to locate fixed points on the standard scale—have been made available for distribution. The necessity for and the means of attaining such standardization is discussed in the recently issued "Technical Report 1150", excerpts from which follow.

The pH unit, used to express numerically the degree of acidity or alkalinity of aqueous solutions, may be defined in a number of ways, each resulting in a slightly different value for the pH of a given solution. Consequently, several pH scales, based upon various definitions, have met with equal favor among chemists. In view of the increasing need in science and industry for accurate determinations of acidity, the National Bureau of Standards is recommending the universal adoption of a single standard pH scale, analogous to the International Temperature Scale. It is proposed that the pH assigned to solutions of buffer substances distributed by the Bureau as Standard Samples be taken as the fixed points on this standard scale.

In the preparation of many commercial products the rapidity and efficiency of the processes depend upon accurate control of the acidity or alkalinity of aqueous solutions. An application of particular importance is the avoidance of corrosion and embrittlement of boiler walls and tubes by regulation of the acidity of boiler water. The widespread losses due to underground corrosion are likewise effectively curbed in many cases by proper adjustment of acidity.

The several convenient pH meters now available commercially enable precise determinations of pH values in such varied media to be made with ease and rapidity, but these values are based upon a scale fixed by the pH assigned to the standards with which the instrument has been calibrated. The differences among scales of pH are the direct result of different procedures, definitions, and assumptions employed in arriving at the pH of the standard. The pH may be defined in one instance as the negative logarithm of the hydrogen-ion concentration or, again, of the effective concentration or "activity" of this ion. Often the pH value as defined by Sorensen in terms of the electromotive force of a galvanic cell with hydrogen and calomel electrodes is chosen. Although the differences among these scales rarely exceed 0.1 unit, the need for greater accuracy makes desirable the general adoption of a single series of consistent pH standards.

In an effort to encourage standard procedure in pH measurements, the National Bureau of Standards is now supplying four buffer materials in the form of Standard Samples of certified purity. These substances are acid potassium phthalate, potassium dihydrogen phosphate and disodium hydrogen phosphate (intended to be used together), and borax. The certificates furnished with these compounds specify the pH of certain aqueous solutions of the sample to provide fixed points on a pH scale.

In order to assign exact values to these fixed points, it was necessary to set up a scale based upon some suitable definition of pH. A consideration of the advantages and limitations of several scales led to a choice of a modified activity scale as most convenient and practical for general use. Although the activity of a single ionic species can be simply defined only in very dilute solutions, the influence of the hydrogen-ion activity in chemical equilibria is of great importance.

The pH of the NBS standards is derived from measurement of the electromotive force of cells without liquid junction, in which they are used as electrolytes. These cells are specially designed, utilizing the highly reproducible hydrogen and silver-silver chloride electrodes. Computation of pH is based upon several reasonable assumed relationships between ionic activities and mean activities. These assumptions are found to give identical values for dilute solutions. The scale thus obtained approaches a true scale of activity for solutions of low concentration; at higher ionic strengths it is best regarded as a consistent scale which necessarily rests upon an assumption not subject to experimental proof.

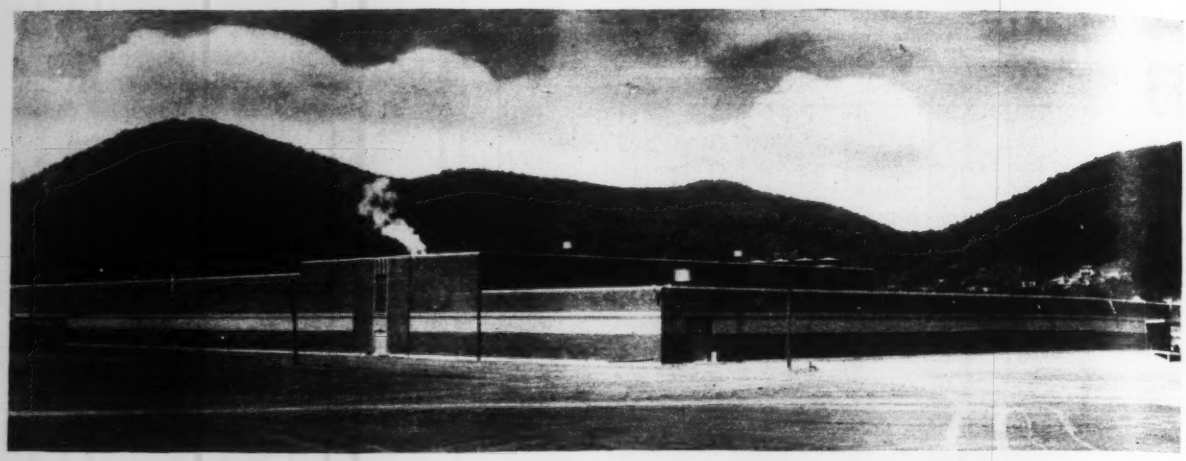


Fig. 1. Bands of gray brick were used effectively to break the monotony of the windowless walls of the new James Lees & Sons Co. carpet-yarn mill. The plant is air conditioned in accordance with process requirements.

Carpet-Yarn Mill—1947 Model

***Contents in Brief**—The new carpet-yarn mill of James Lees & Sons Co. at Glasgow, Va., is a windowless, one-story, 309x459-ft. building in which are embodied advanced ideas in air conditioning, lighting and materials handling. Designed to minimize maintenance, the plant features functional painting, tunnels for air and utilities, hung ceilings and parquet floors.*

PROGRESSIVE THEORIES for achieving low-cost production and for improving working conditions have been put into practice in the $3,500,000 spinning-room and dyehouse addition to the carpet-weaving mills of James Lees & Sons Co. at Glasgow, Va. The plant is air conditioned and well lighted; materials handling is mechanized to the fullest extent; color is used functionally; music is furnished through a public-address system to lessen fatigue; and floors, walls, and ceilings have been designed to minimize maintenance.

Provision for future expansion is incorporated in the plans by locating major departments along the outside walls, at the same time providing for an efficient flow of work in process in a U-shaped pattern. To allow room for expansion, underground mains for connection to sprinkler lines are set 150 ft. clear around the plant.

With the exception of an office wing and small service buildings, all departments are housed in a windowless, one-story 309x459-ft. structure (Fig. 1). The frame is structural steel, with a beam-and-girder roof system supported on columns spaced about 25 ft. by 28 ft. apart. The roof consists of a precast concrete deck, over which is 1½ in. of glass-fiber insulation, a covering of fiber board and built-up tar-and-gravel roofing.

Exterior walls are brick. For architectural purposes, both a narrow and a wide horizontal band of gray brick are used on the outside to relieve the monotony of the otherwise solid-red facing. Salt-glazed tile, chosen for maximum cleanliness and minimum maintenance, is used for interior walls practically throughout the plant.

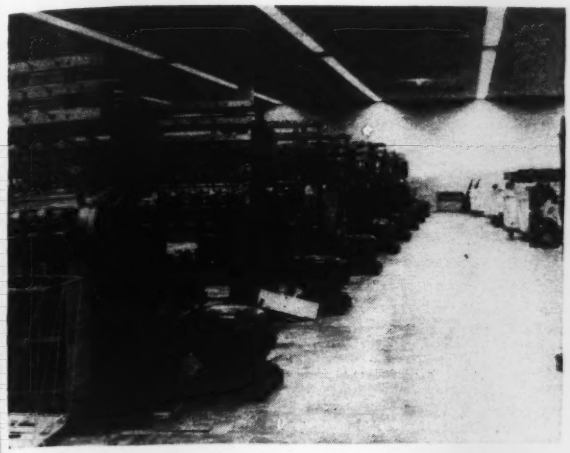
Concrete floors are finished with a variety of materials—creosoted wood block in the machine shop, acid-proof brick in the dyehouses, asphalt tile in the offices, rubber tile in the laboratories, cement in the locker rooms and toilets, and maple parquet in the spinning and finishing departments. To achieve better wearing qualities and to simplify floor repair without detracting from the original appearance, the parquet floors are set in a cross-grain pattern on mastic and felt in 9-in. squares of six strips each.

Throughout the plant, color is used functionally, with red applied exclusively to fire-protection equipment, blue to electrical panels and switches, and orange to the interior of fuse-box doors. Ceilings are mostly white, and side walls are of light shades down to dado height, where medium grays, greens and tans predominate. Piping is made inconspicuous by using the same color as the background, but contents are identified by code bands.

Air conditioning aids processing

To meet various process requirements, several air-conditioning systems have been installed. The main system serves the carding and spinning room, and a supplementary smaller one provides for close control in the physical and chemical laboratories. Other systems provide for ventilation and humidification in the blending room, and ventilation, with controlled temperatures, in the yarn-storage, locker and toilet rooms, skein and raw-stock dyeing sections, and other service areas.

Having a capacity of 165,000 cfm., the main system consists of an air-



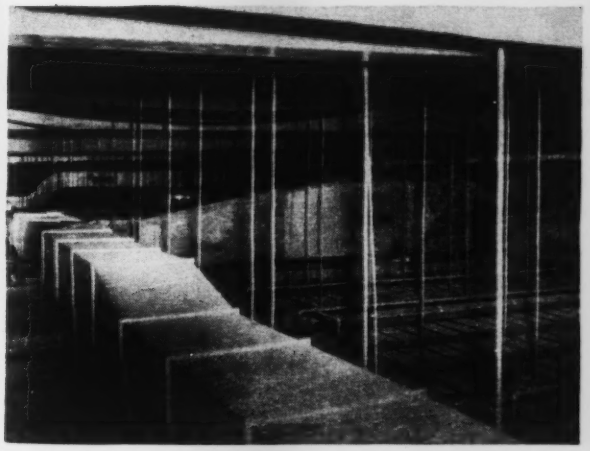


Fig. 2. The twisting section of the spinning room (left) has a maple parquet floor, salt-glazed tile walls, and an acoustical-plaster ceiling in which are set recessed fluorescent fixtures, air diffusers (circular) and public-address units (square). Above the hung ceiling (right) are air-conditioning ducts and piping.

washer, renewable paper-mat air filters, lint screens, water-circulating pumps, steam-turbine-driven supply and return fans, and distribution ducts. Automatic controls are provided to maintain 75- to 80-deg. temperatures and a humidity of 55 to 60 percent. Duplicate equipment is provided in certain parts of the system to assure continuous operation.

In the 168x279-ft. spinning room, conditioned air is introduced through stainless-steel diffusers set in a hung-flat. acoustical-plaster ceiling at 15-ft. height above the floor (Fig. 2 left). The room is heated by means of unit heaters in the air-conditioning ducts, which are installed in a 10-ft. attic space above the ceiling (Fig. 2 right).

In the attic are also placed electrical wiring, sprinkler piping and catwalks for maintenance servicing. By heating the attic with thermostatically-controlled unit heaters located outside the ductwork, heat-insulation costs are conserved and undesirable air circulation in the spinning room minimized.

Dual use made of tunnels

Through stainless-steel grills placed intermittently along two opposite walls, air is exhausted from the spinning room at floor level into two concrete-lined walkway tunnels. The air is then drawn from the tunnels by a large return-air fan for re-tempering and recirculation. Housing piping and utilities, as well as serving as return-air ducts, the two tunnels are connected by several similar, transverse tunnels located in such a way that electrical power lines can be brought to every machine.

Fig. 3. The dye-house has electrically operated materials handling equipment, an acid-resisting brick floor, salt-glazed tile walls and cement-plaster ceiling with vapor-tight incandescent fixtures.

Underground facilities are also incorporated in the design of the dye-house, where an attempt is made to eliminate many of the usual maintenance and operating problems arising from the presence of heat and moisture. Under the main floor is a concrete-lined basement that acts dually as an air plenum and a pipe chamber for all dye vats. Outside air is introduced into the basement at slight pressure under automatic temperature control, heated and blown through a small, annular space that surrounds each vat. Absorbing waste steam and eliminating fogging, the rising air provides a film around each kettle that protects the worker against steam, fumes and heat. Finally, the saturated air is exhausted to the atmosphere through natural-draft ventilators, which are designed for later insertion of power units, whenever necessary.

Above the skein-dye section, which uses open vats, is hung a hood-shaped, smooth-finished, cement-plaster ceiling, 30 ft. high at the top, or point of

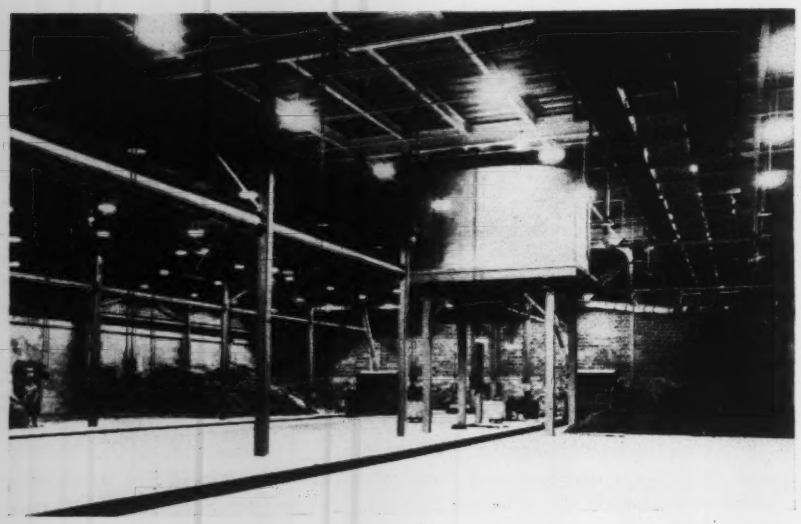


Fig. 4. In the blending room, three overhead conveyors drop wool to any one of 45 places on the floor and two belt conveyors recessed in the floor carry mixtures to pickers at the far end. The tank stores 40,000 gal. of water at 185 deg. F. for use in the dyehouse.

exhaust. Condensation on this ceiling is prevented by maintaining its temperature above the room dewpoint through the use of unit heaters inside the attic. Air-lock vestibules between the dyehouse and adjacent departments prevent objectionable interchange of atmosphere.

Water supply and sewage treatment

Water for the air-conditioning system is obtained at a temperature of about 56 deg. F. from two 800-gpm. wells and is stepped up to 70 deg. in the conditioning process. Flocculated, filtered, softened and treated with a rust inhibitor, the water is then used for processing. Domestic requirements are met from the supply system of Glasgow.

For minimum maintenance, all hot-water lines in the plant are of copper pipe, with welded joints and flanged valve connections. Cathodic protection against corrosion is resorted to for metal water-storage tanks. Kettle drain pipes are of special acid-resisting alloys.

In addition to treatment of the water supply, it was necessary to provide dual sewage disposal facilities. Industrial wastes are collected separately, and solids, grease and oils removed before discharge into a river. Sanitary flows are treated in a plant consisting of a pumping station, Imhoff tank, rotary trickling filter, final settling tank and sludge-drying beds, and the effluent is chlorinated before discharge into the river.

Electric energy is obtained from a utility company at 44,000 v. and transformed to 2,400 v., 3-phase, by means of a 3,000-kva. substation. A 1,500-kva. unit-type substation in the spinning mill reduces the voltage to nominal 480 v. for power. Dry-type transformers then bring the voltage down to 110/220 for lighting. In case of power failure, an emergency lighting system powered by an automatically controlled, gas-engine-driven generator is available.

Uniform lighting intensity of 25 ft.-candles is achieved in the spinning and twisting sections by continuous runs of recessed fluorescent ceiling fixtures on 12½-ft. centers. Fluorescent lighting is also used in offices, laboratories and machine shops, where fairly high intensities are required. In the air-conditioned areas, this type of lighting is advantageous because it throws off less heat than the incandescent type.

In moist locations, or very dusty areas, vapor-tight fixtures of the incandescent type are provided. In the main warehouse and miscellaneous locations, such as closets, shipping areas and tunnels, incandescent units are used because they are less expensive.

Wherever posible, mechanized handling is resorted to throughout the plant. For example, in the dyehouse (Fig. 3), wool stock is dropped from chutes leading from an upper level into raw-stock dye vats; a 5-ton traveling monorail hoist carries raw stock from the vats to deep-pit feeds, rinse bowls and dryers; and four 15-ton cranes operating on two 100-ft. craneways move the heavy, wet, skein-dyeing racks from the 2000-lb. kettles.

In the 68 x 101-ft. blending room, where the ceiling height is 28 ft., wool from the raw-stock dyehouse is sucked to overhead conveyors (at 20-ft. elevation), which can drop it to the floor in any one of 45 places (Fig. 4). Recessed 12 in. below the floor, conveyor belts transport wool mixtures to deep-pit feeds leading to pickers at one end of the room, from which it is pneumatically carried to storage bins. All blending-room conveyors are controlled at automatic pushbutton stations.

Robert E. Oberholtzer is chief plant engineer for James Lees & Sons Co. The Ballinger Co. of Philadelphia, Pa., was architect and engineer, while the Daniel Construction Co. of Greenville, S. C., was general contractor.

Equations Solved By New Method

Occasionally, engineers find it necessary in analytic work, such as in the case of complex structural frameworks, to solve simultaneous equations. By a new method, described in a paper, "Variation of Coefficients of Simultaneous Linear Equations," by Bernard L. Weiner in *Proceedings* of the American Society of Civil Engineers, Oct., 1947, many of the problems connected with classical methods of solution can be eliminated.

The new method is based on formulas that evaluate the effect on all the unknowns of changing the coefficients of one of the unknowns. Beside enabling more rapid solution of equations, the procedure also has other advantages, according to the author. For example, in structural analysis, where the coefficients are functions of the dimensions of the members of a framework, the effect on stresses of a change in these coefficients can be determined without the necessity of resolving the equations, as required by classical theory.

Tax Problems in Long-Term Contracts

Harry W. Wolkstein
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Contents in Brief—For Income Tax purposes there probably is a cash advantage in reporting long-term construction jobs on the percentage-of-completion basis. This will equalize the net income and aid in minimizing the long-term tax obligation. Suggestions are made for filing returns to keep payments to a minimum. Legal decisions are cited on pertinent points.

LARGER CONTRACTS, coupled with a shorter work week, materials shortages and labor disputes as well as other delaying factors, have lengthened many construction operations. This raises the question of how to report income most advantageously on long-term contracts for income-tax purposes. In this discussion a long-term construction contract is defined as one that requires more than twelve calendar months to complete.

Net income on construction must be computed with respect to a fixed period known as a taxable year and all gross income must be reported in the tax year in which it is earned. In Section 41 of Regulations 111 of the federal statutes it is provided that "Net income shall be computed upon the basis of the taxpayer's annual accounting period in accordance with the method of accounting regularly employed in keeping the books of such taxpayer; but if no such method of accounting has been employed, or if the method employed does not clearly reflect income, the computation shall be made in accordance with such method as in the opinion of the Commissioner of Internal Revenue does clearly reflect the net income."

Short-term contracts present relatively few tax problems, for they may be reported on either the cash or accrual basis. In reporting on the cash basis, the contractor must determine his net taxable income by reporting all the gross income received and deducting only the amounts actually paid out during the taxable year. This method may not properly reflect net income for each taxable year as required by law. The revenue bureau may then insist upon another basis that may greatly increase the contractor's income tax obligation for that year. Experience has been that the change is made in the year when the greatest amount of tax will result.

Most contractors file their income-tax returns on the accrual basis, by which they report income when earned and expenses when incurred, regardless of the time when received or paid in cash. The accrual method of accounting requires that at the close of each fiscal year all income that has been earned must be recorded as accrued, regardless of whether or not it has been collected.

Many difficulties are encountered in determining the gross profit on an uncompleted long-term contract during the taxable year. Further difficulties are met in determining future gross profit on a long-term contract that is in process at the close of a fiscal year. Federal income-tax regulations provide (Section 19.42–4 of Regulations 103) for reporting income from long-term contracts by authorizing a modification of the accrual basis, under which gross income derived from such contracts may be reported on:

Completed Contract Basis: Gross income from long-term contracts and contract costs incurred may be deferred and reported in that taxable year in which the contract is finally completed and accepted, even though the taxpayer has not received the final payment under the contract. This method, referred to as the "completed contract basis," if once elected by the taxpayer, must be used consistently and must clearly reflect the net income of the taxpayer.

Percentage-of-Completion Basis: Gross income from long-term contracts may be reported on the "percentage-of-completion basis." Each such federal income-tax return should be accompanied by a percentage of completion certificate of the architect or engineer on the long-term contracts in process at the close of the taxable year. The contractor thus reports annually an amount of gross income measured by the ratio of work completed during the taxable year to the entire work called for by the contract.

If the contractor has previously reported on the cash basis, and obtains the revenue commissioner's permission to report long-term contracts on the completed contract basis, he still is permitted to report gross income from short-term contracts on the cash basis.

There have been a number of court cases revolving around the basic question of how to compute a contractor's taxable income for a given fiscal year, as related to long-term contracts.

In R. G. Bent Co. v. Commissioner (56F(2d)99) the Court held that under existing regulations, the method regularly employed in filing tax returns by the company, which was engaged in constructing reservoirs and dams, is a more important consideration than the method of keeping the books, "We see no reason why, as a general proposition, the use of the accrual method of keeping the books should be said to preclude the use of the long-term contract method of reporting income." Thus, a contractor may keep his books on the accrual basis, and yet report on the long-term contract basis.

Until recent years, many contracting firms found the "completed contract basis" to be more conservative, thereby deferring reporting of gross profit on each long-term contract until definitely earned or lost. Under

current federal tax legislation, continued use of the "completed-contract basis" may result in the contractor being penalized severely in that one peak year in which he may complete a number of profitable contracts, because of increased surtax rates for individuals, and graduated normal tax and surtax rates for corporations. The contractor will receive no tax credit in the following year, which he may close with all uncompleted contracts, other than the possibility of a net-loss carry over.

The construction company desirous of properly minimizing its federal tax obligations, will find that as a rule the "percentage-of-completion basis" of reporting its income is the more advantageous. This will serve to equalize the net income over a period of years and will avoid great fluctuations of net income from year to year. This advice is supported by the comment of the Tax Court in James C. Ellis v. Commissioner (16BTA1225): "It is true that returning income on the completed contract basis may result in a larger income in a given year than would be reported for the same year were the profit spread over the entire term in which the contract was performed." It should be noted that if a contractor finds that a recently filed income tax return contains an inaccurate estimate of the percentage of profits on a particular long-term contract, he usually has the privilege of filing an amended tax return.

How to apportion overhead

Where an officer or a salaried employee of a contracting company devotes a portion of his time exclusively to a particular contract, the proportionate amount of his salary is part of the cost of that contract. However, when a contractor reports on a completed contract basis the salaries of officers or employees whose services are administrative in character and not devoted to any particular contracts are deductible in the fiscal year in which paid or incurred.

For some unknown reason, contractors frequently overlook the fact that payroll taxes and workmen's compensation insurance premiums, as related to contract payroll, should be treated as contract costs and not as administrative expenses.

In National Contracting Co. v. Commissioner (25BTA407) the U. S. Tax Court approved of the contractor's method of apportoining overhead expenses of each job in the proportion that total overhead bears to total direct costs.

Contingencies not deductible

A construction company frequently must set aside a reserve for contingent or estimated costs to maintain its work for a period following the completion of a long-term contract. Is the contracting company permitted to increase its annual deductible expenses by the amount of this contingent reserve? This question was decided by the U. S. Circuit Court of Appeals in the case of Spencer, White & Prentis, Inc. v. Commissioner (144F 2d 45), wherein the Court ruled that the taxpayer could not deduct from accrued income the estimated cost of future restoration work for which it was liable, since the liability for the estimated deduction had not accrued during the year in which the deduction was sought.

Maintenance clauses and reserves

Ordinarily, in reporting long-term contracts, it is the right to receive the fees and not the actual receipt that determines the proper year in which the gross income is to be reported. On long-term contracts which contain guarantee clauses or maintenance clauses, the contractor should be governed by the following rule:

"Income derived from contracts containing guarantee clauses, guaranteeing work thereunder against imperfections due to faulty workmanship and defective materials for a period of one or two years after the completion of the subject matter of the contract, should be included in the gross income in the year in which received and the work completed, and not at the end of the guarantee or maintenance period." Scholl Co. (30BTA-993)

The ruling of the court in Vang v. Lewellyn (35Fed 2d 283) on maintenance clauses in construction contracts is an important one:

"We hold that, when the construction work was completed, contract price paid and the road turned over to the city or county, the contract was completed, disclosing definitely a gain or loss in the transaction. The company's engagement to maintain the work in good condition for five years after the completion as a pledge of its workmanship was clearly a contingent liability which might or might not cost money—and, accordingly, might or might not reduce the net income from the contract closed by final payment long before. Costs of mainteance, if any, would of course be a subject for reduction from income in the year in which income was received, but such costs, having no effect upon or relation to the final payment of the contract price at the end of the work would not keep the contract open and postpone payment of the tax on the income received."

The recent case of Ehret Day Co. v. Commissioner (2TC25) emphasizes disadvantages of the "completed contract basis" for present-day contractors. The contractor completed a building in all important particulars in 1938. The architect issued his certificate of acceptance in September, 1938, but at the close of 1938 several minor defects in workmanship remained to be corrected, and $846.44 was retained for purposes of final adjustment. The building being finally accepted in February, 1939, the contract income was reported by the contractor in 1939 and not 1938. Tax Court held that the architect's certificate was conclusive, so that the gross income pertaining to this contract should have been reported in 1938, when it was substantially completed. This firm filed its income tax returns on the completed contract basis. The "percentage of completion basis" would have been of advantage to this contractor from the standpoint of tax minimization, since the Commissioner could not raise a question as to the year of completion.

Retained guaranty funds

The contractor usually is required to report the full amount of gross income earned in each taxable year, including the earned percentage that is retained by the owner. However, where the contractor does not have the unqualified right to receive the full amount, even though the contract may name a definite figure, the amount retained usually need not be included as income in the year the contract was completed. This rule applies where a specified amount is retained in a guarantee fund for a

specified period of years, and affects contractors that file on the completed contract basis.

The Circuit Court held in the case of Commissioner v. Cleveland Trinidad Paving Co. (62F 2d 85) that "Amounts withheld in 1924 and 1927 from paving contract price, to be paid to the contractor after a period of years if not expended for maintenance, do not constitute income on the accrual basis to the contracting company for the years in which withheld."

A construction firm that files on the "cash basis" need not report the amount retained by the owner until the year in which it is finally collected.

Reporting amounts in litigation

Damages received by a contractor for a breach of contract generally represent income in the year received, despite the fact that the taxpayer is on a completed-contract basis. However, in the case of Sternberg (32 BTA1039) where the damages received were for breach of only a part of the contract, the Tax Court held that the income therefrom may be reported upon the completion of the contract.

The Newman & Carey Subway Construction Co. completed a contract for the construction of a section of a subway in Brooklyn in 1921 at a loss of $671,130.98. This firm filed its tax returns on the completed contract basis. It sued New York City and recovered a judgment in 1935 for $679,751.83 and interest. The Tax Court held (37BTA1163) that the damages recovered were taxable income in the year 1935 and did not belong in 1921.

In Commissioner v. Sanford & Brooks Co. (282 U. S. 359) the U. S. Supreme Court held that the amount of a judgment paid to the taxpayer in 1920 incident to a long-term contract partly performed in 1913 to 1916, in which years losses on the contract had been reported on the basis of cash receipts and expenditures, was income for 1920 when the losses were reimbursed.

The Courts generally have ruled that when a claim is asserted against a contractor, and the contractor completely disputes the claim, the contingent liability is not a deductible expense of that year. Where the contractor admits some liability and the dispute is solely as to amount, a deduction for an estimated amount may be taken.

The ruling of the tax court in Carolina Contracting Co. (32 BTA 1171) should be noted in this connection. Petitioner completed paving contracts in 1932, which work was accepted by the county in 1932. Litigation resulted thereafter and was settled in 1934 when petitioner was held responsible for certain debts of his subcontractor, so that this added expenditure plus his previous costs exceeded his contract income. The contractor was reporting on the completed contract basis. The Court held that the petitioner received no taxable income from the contracts in 1932, and that the contract was not reportable for tax purposes until 1934.

Under usual circumstances, a contractor will find it advantageous to report long-term contracts on the "percentage-of-completion basis" in tax returns, to equalize net income and minimize income tax obligations over a period of years. The contractor may change from the "completed-contract basis" to the "percentage-of-completion basis" by obtaining written approval from the Commissioner of Internal Revenue, the contractor's request for this approval being filed with the Commissioner within 90 days after the beginning of the taxpayer's fiscal year.

Analysis of past income tax returns, may indicate the possibility of tax refund claims being in order due to a more advantageous basis for filing or changes in regulations or rulings. A refund claim is timely if filed within two years after payment of the income tax, or within three years after filing of the original tax return.

Major Charter Changes Get Voters' Approval

Major charter changes designed to make local government more responsive to modern urban needs were approved by many cities this fall.

Richmond, Va. is the biggest city to replace a cumbersome old charter with a more "streamlined" version, The International City Managers' Association reports. Denver is the only major U. S. city which rejected charter revision in recently held elections.

Most important charter changes generally provide for simpler and more flexible local government by centralizing authority and responsibility in fewer officials and departments.

Medford, Quincy, Revere and Worcester, Mass. recently approved city manager plans to replace systems in which the mayor was chief administrative officer. Fitchburg and Pittsfield, Mass., rejected council-manager plans.

San Francisco and several other cities, while not putting new charters into effect, voted for more centralized local government by combining certain city departments. Stamford, Conn., meanwhile voted to merge its over-lapping city and county governments and thereby abolish much duplication of effort.

Richmond's new charter creates a council-manager administration and takes authority to appoint key city officials from the council and gives it to the manager.

Biggest single step toward simpler government in the new Richmond charter is abolition of the bicameral city council. A single-house body will now govern the city. Only 14 U. S. cities still cling to bicameral councils.

The four Massachusetts cities adopting the city manager plan also approved the proportional representation method of electing councilmen. New York, Long Beach, N. Y., and Boulder, Colo., meanwhile took the opposite tack of abolishing PR plans previously in effect.

Proposed charters or revisions are being drafted in other cities. Minneapolis voters will decide on a new charter next year. St. Louis officials also are working on a new charter. A new proposal by a Congressional committee would give Washington, D. C., broad self-rule powers under a council-manager system.

Comment and Discussion

Readers' opinions on matters that concern engineers and contractors

Composite Girder Bridges

Sir: Describing the Cattaraugus Creek Bridge (*ENR*, Dec. 26, 1946, vol. p. 856) E. W. Wendell states that information obtained in the construction of this structure will be utilized in future work, and bridge design thus further advanced. Observation of the behavior of actual structures is a suitable means indeed to advance design, especially if the structure is novel and economical. The features of this bridge, however, were used in the past, and whether or not composite simple girders are economical merits investigation.

Comparison of the calculated and measured deflections of continuous plate girder bridges, having concrete decks resting on the top of the girders, indicate that without the addition of shear devices composite action of deck and girders is achieved. In support of this statement differences between the calculated deflections neglecting composite action and the measured deflections of two bridges may be noted, the differences being expressed by the percentage of reduction of the calculated deflections:

(1). Oste River Bridge, Hechthausen, Germany. Built 1934. Six 372-ft. riveted continuous girders, 90-190-90-ft. spans. Intermediate cross frames: 2 in the side spans, six in the center span. Width of bridge 38-ft., width of roadway 28.4-ft., thickness of slab 8-in. Test load, two 23.1-ton vehicles. The measurements were made at a temperature of 17.6 deg. F. End span: vehicles side by side, reduction 33 percent; vehicles in tandem, reduction 60 percent. Center span: vehicles side by side, reduction 41 percent; vehicles in tandem, reduction 60 percent.

(2). Lippe River Bridge, Wesel, Germany. Built 1937. All welded. Two 330-ft. continuous girders, 164-164-ft spans. Five intermediate cross frames per span. Width of bridge 37-ft., width of roadway 24.6-ft., thickness of slab 8-in. Test load: two 20-ton vehicles in tandem, reduction 67 percent.

These very considerable differences between the calculated and actual deflections are due to the load distributing effect of the cross frames and T-beam action of deck and girders. The 67 percent smaller than calculated deflections of the Lippe River Bridge are of particular interest; having only two girders the action of this structure is especially clear.

These measurements indicate that the reduction of the section of the steel girders in the design on account of using shear devices at the junction of deck and girders is a self deceiving economy, because cooperation between deck and girders exists whether such devices were used or not. In fact, measurements made on a large number of bridges, in service for many years, always indicated smaller than the calculated deflections due to the composite action of deck and girders or trusses and due to the considerable load distributing effect of the cross framing.

The economic significance of the clarification of all questions pertaining to composite action and load distribution in actual structures suggests that the calculated deflections and stresses (load distribution according to the AASHO specifications), be compared with their measured values, due to the same load, occurring simultaneously in all girders, cross frames and deck, of the following bridges:

1. Capital Ave. Bridge, Frankfort, Ky., Cont., Built 1938
2. Kansas River Bridge, Topeka, Kan., Cont., Built 1938
3. Salt River Bridge, West Point, Ky., Cont., Built 1943
4. Black Warrior River Bridge, Foster's Ferry, Ala., Cont., Built 1944
5. Santee-Cooper Tailrace Bridge, S. C., Cont., Built 1945
6. Cattaraugus Creek Bridge, SW of Buffalo, N. Y., Simple, Built 1947

This work, the first step in the investigations, could constitute useful assignments for advanced degrees at universities and carried out in cooperation with the state highway departments. Knowledge of the actual conditions would help to improve the authoritative design specifications and effect a more rational design of deck of spans and bridge floors. A further step in the investigations would be to bring design practice in full accord with the great deal of knowledge that has been assembled concerning these questions during the past 30 years and remained unnoticed. Measurements on such improved bridges then would lead to new ideas and to real progress.

LOUIS BALOG
Consulting Engineer
Binghamton, N. Y.

National Representation

Sir: Your editorial "National Representation for Engineers" in the Oct. 30, 1947, issue of *Engineering News-Record* strikes a very responsive chord in the thinking of many of the leading engineers in this region.

It is an indication, at least, that the National Society of Professional Engineers is fast becoming potent enough in the engineering world to attract attention. No one seems to have any quarrel with the objectives of NSPE for it is attempting to do for the engineering profession those things that none of the Founder Societies is doing or perhaps can do.

It is not unreasonable to believe that if the Founder Societies would encourage their respective members to give every support possible to NSPE the result would be an organization that could do much toward a better professional standing of all engineers.

As stated A. B. Parsons in his editorial comment in *Mining & Metallurgy*, February, 1947:

"A dynamic organization of dues paying members has many advantages; and, as such, the NSPE seems to merit careful consideration by those who have at heart the best interests of the engineering profession. It is important to make clear that each of the technologic societies would continue to promote in its own way the professional and economic interests of its own members."

RALF R. WOOLLEY,
Secretary,
Utah Society of Professional Engineers,
Salt Lake City.

Book Notes and Reviews

The month's addition to the engineer's reading and reference list

Data Book Completed

FIELD PRACTICE—Volume III of Data Book for Civil Engineers. By Elwyn E. Seelye. 306 pp. John Wiley & Sons, New York; Chapman & Hall, London. $4.50.

With the publication of this volume, Elwyn E. Seelye completes a task begun in 1945 with the publication of Volume I, Design (*ENR* Jan. 10, 1946, vol. p. 72). That was followed in 1946 by Volume II, Specifications and Costs (*ENR* Aug. 8, 1946, vol. p. 139).

The small size of this third volume will surprise those who acquired the earlier volumes, both of which have unusually large pages to facilitate the use of charts; but the pocket size of Volume III will add materially to its usefulness because it can be carried into the field conveniently.

Like the two earlier volumes, this one is filled with material that the author by long experience has found useful. Most of the book relates to field inspection of concrete, masonry, structural steel, bituminous paving and timber; also to welding, pile driving, pipe laying and soil testing. Part II of the book is given over to surveying.

Architectural Concepts

ARCHITECTURE—AN ART FOR ALL MEN—By Talbot Hamlin. 279 pp. Columbia University Press, New York. $3.50.

ARCHITECTURAL CONSTRUCTION—By Theodore Crane. 414 pp. John Wiley & Sons, New York, Chapman & Hall, London. $6.

Three inseparable characteristics are always found in great works of architecture—utility, strength and beauty. They are inextricably integranted in the final building because all three considerations were present in the architect's mind during the design stage. With this as his thesis, Mr. Hamlin analyses architecture for the benefit of the layman. He describes the various forms of construction, the relation between function and design, the achievement of unity, balance, proportion, functional expression and harmony of style and structure; the use of ornament and the relation between architecture and the community. On the other hand, with the same thesis, Mr. Crane seeks to aid designers in selecting the most appropriate structural system for a building. Presenting a resume of structural types now available in the United States, his book fills the void between a descriptive study of materials and types of construction and the final design of structural members.

Recommended Reading

THE LIFE AND WORKS OF WILLIAM CAWTHORNE UNWIN—By E. G. Walker. 239 pp. George Allen & Unwin, 40 Museum St., London. Obtainable through Stechert & Hafner, Inc., 31 East 10th St., New York 3. Price $3.75.

Any engineer could read this book with both pleasure and profit. In the first place, it is a well-written book, and in addition to being the biography of one of the great engineers of all times it includes much information on engineers and engineering in the first half of the Nineteenth Century as background for the account of William C. Unwin's life.

Unwin began his active engineering career in 1856 as an assistant to William Fairbairn, one of the foremost engineers of his day in Great Britain, devoting his attentions to the research work in which Fairbairn was then so deeply absorbed. Included were studies of bridge design, then based entirely on empirical rules. He also did considerable work on boiler design and brakes for railway trains.

In 1862, Unwin was appointed works manager for Williamson and Brothers, builders of mill machinery and water-power plants. It was during this period that he developed an interest in the design of water wheels and other hydraulic problems which lead ultimately to an exchange of correspondence with Clemens Herschel. Included in the book is a plate reproducing a letter dated June 5, 1888, from Herschel to Unwin telling of Herschel's development of the Venturi meter and illustrated with a rough sketch of the meter.

By that time Unwin was well-established in the teaching work to which he devoted much of this life. This work began with lectures to officers of the Royal Engineers at Chatham in 1864-65 and again between 1868 and 71 after he had returned to the Fairbairn Engineering Co. as manager of the engine department. In 1869 he was named an instructor at the Royal School of Naval Architecture and Marine Engineering. Three years later he was designated professor of hydraulic and mechanical engineering at Royal Indian Engineering College, set up by the government to train engineers going to India, a position that he retained until 1884. In that year he was offered the professorship of civil and mechanical engineering at what later became the Central Technical College in London.

Of special interest to American engineers during this period was his appointment in 1890 to the International Niagara Commission, a board of engineers set up to pass upon proposals for development of power at Niagara Falls.

Unwin retired from teaching in 1904 at the age of 65 but continued active on a variety of engineering assignments until within a few years of his death in 1933.

Cost Estimating

CONSTRUCTION ESTIMATES AND COSTS—By H. E. Pulver, revised second edition, 653 pp. McGraw-Hill Publishing Co., New York 18, and London. $6.

Changing the labor rates and a few other numbers falls far short of making an adequate revision of a text on construction cost. But that is as far as the second edition of Construction Estimates and Costs has gone.

Much more might have been done for this text, which was first published in 1940. It devoted then, and still does, more space to horse and wagon earth moving than to tractor-drawn scrapers.

A usable tie between costs given in the book and regularly published cost indexes would be helpful to the estimator in keeping up with constantly changing prices of labor and material.

As a reference, the book offers

fundamental data and pertinent comment on most construction subjects. The usual ranges of production and cost are outlined as a guide in unfamiliar work. Time required to do a unit of work is emphasized instead of work done per hour. In general, the suggested maximum figure for production is twice the minimum. It has not been changed since the first edition while productivity of labor has dropped by perhaps a fourth, indicating that the lower figures are now nearer correct. This does not apply where improved equipment or technique has not been taken into account.

Industrial Waste Disposal

INDUSTRIAL WASTE DISPOSAL FOR PETROLEUM REFINERIES AND ALLIED PLANTS—By W. B. Hart. 103 pp. Published by Petroleum Processing, Cleveland, O.

Originally published as a series of articles intended primarily for refinery engineers, this fundamental material is applicable to various types of waste control.

The book is divided into five main sections: Economic and Legislative Aspects; Kinds of Wastes; Effects of Industrial Wastes; Preliminary Investigations; and Treatment of Oil-Containing Wastes. It contains numerous illustrations and tables.

For the engineer working every day on industrial waste control, this volume will serve as a handy reference. A detailed index is included which facilitates finding answers to specific problems. In addition, a bibliography of 174 references will aid collateral study.

Miscellaneous Notes on Booklets and Repairs

SUMMARIES IN ENGLISH of the papers on hydraulics appearing in *Vizugyi Kozlemenyek*, a Hungarian journal, are again being published. Copies can be obtained from the editor of the journal at P. O. Box 70, Budapest 112, Hungary.

VALUABLE HIGHWAY STATISTICS covering the past three or four decades will be found in "Highway Statistics: Summary to 1944" just published by the Public Roads Administration, Federal Works Agency, Washington 25, D. C. Covered in the pamphlet are motor fuel taxes and consumption, various statistics relating to motor vehicles, highway taxation, highway finance, and highway mileage. Most of the statistics go back to 1914 or 1917, and a few go farther back. They all form a background for the annual tabulations of highway statistics now put out by the Public Roads Administration. Copies of the pamphlet can be obtained from the Superintendent of Documents, Washington, D. C. for 40c. A tabulation of the corresponding statistics for the year 1945 also can be obtained from the same source for 35c.

TO MEET THE NEED in frame analysis for design constants for haunched beams, a "Handbook of Frame Constants" has been published by the Portland Cement Association (33 West Grand Ave., Chicago) and is being distributed free upon request in the United States and Canada. It contains 62 tables, practically all of which are devoted to coefficients useful in computing carry-over factors, stiffnesses and fixed-end moments.

TABLES to eliminate tedious design calculations comprise a 44-page pamphlet, "Allowable Loads on Eccentrically Loaded Columns," by I. E. Morris. The tables are based on 1947 American Concrete Institute Building Regulations and give values for 3,000 and 3,750-psi. concrete for eccentricities up to 14 in. Included are loads for square tied columns varying in size from 12 to 30 in. in 2-in. increments; for square columns with spirals, varying from 14 to 33 in. in 1-in. increments; and for round columns with spirals, varying from 14 to 34 in. in 2-in. increments. The pamphlet may be obtained for $2.50 from the author, P. O. Box 788, Atlanta, Ga.

A REPORT on the house construction developed by the John B. Pierce Foundation is given in a pamphlet, "Evaluation of a Steelframe Construction System." The Pierce system uses lightweight, widely spaced columns, which support lintel girders and roof trusses, and curtain walls of stressed-skin box girder plywood panels. Available at 50c. per copy from the foundation, Raritan, N. J., the research study purports to show that a soundly engineered house built with substantially less material than conventional ones can meet reasonable and rational requirements for structural adequacy.

STRESSES IN THIN SHELLS may be found by several methods, as shown in a pamphlet, "Theory of Elasticity for Thin Circular Cylindrical Shells," by Sigge Eggwertz. Published by the Institution of Structural Engineering and Bridge Building, the Royal Institute of Technology, Stockholm, Sweden, it summarizes the development and use of design methods for shells in Europe, including solution of the differential equations obtained by the theory of elasticity, the flexion theory, the membrane theory and the beam method.

New Engineering Books

CONSTRUCTION ESTIMATES AND COSTS—Second Edition—By H. E. Pulver. 653 pp. McGraw-Hill Book Co., New York 18 and London. $6.

ELEMENTARY DIFFERENTIAL EQUATIONS—Third Edition—By L. M. Kells. 312 pp. McGraw-Hill Book Co., New York 18 and London. $3.

LABOR RELATIONS AND HUMAN RELATIONS—By B. M. Selekman. 255 pp. McGraw-Hill Book Co., New York 18 and London. $3.

ENGINEERING APPLICATIONS OF FLUID MECHANICS—By J. C. Hunsaker and B. G. Rightmire. 494 pp. McGraw-Hill Book Co., New York 18 and London. $5.

TECHNIQUES OF STATISTICAL ANALYSIS for Scientific and Industrial Research and Production and Management Engineering—By the Statistical Research Group, Columbia University. 473 pp. McGraw-Hill Book Co., New York 18, and London. $6.

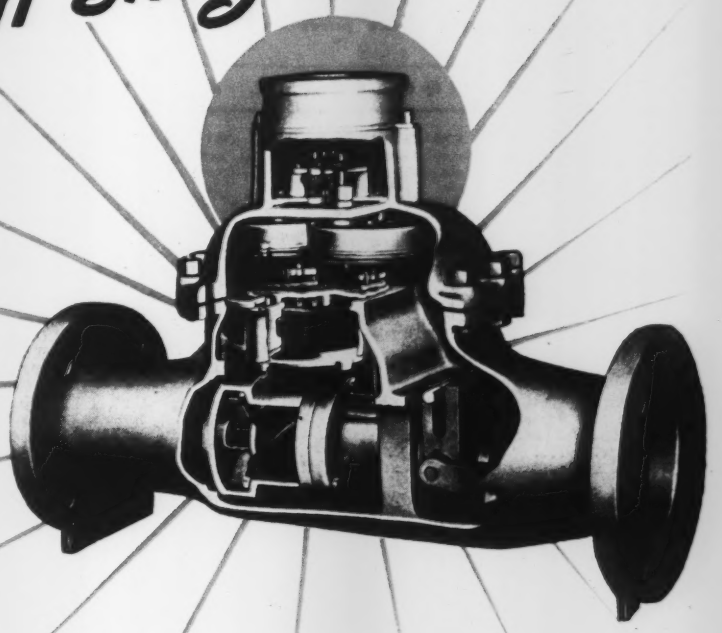
YEAR BOOK-1946-1947—NEW YORK STATE SOCIETY OF PROFESSIONAL ENGINEERS—516 pp. 1941 Grand Central Terminal New York 17. $10.

STATICS—By J. H. Kindle and H. L. Miller. 171 pp. Ginn and Co., Statler Building, Boston 17, Mass. $2.50.

PROBLEMS IN ENGINEERING DRAWING—Series II—By A. S. Levens and A. E. Edstrom. McGraw-Hill Book Co., New York 18 and London. $2.75.

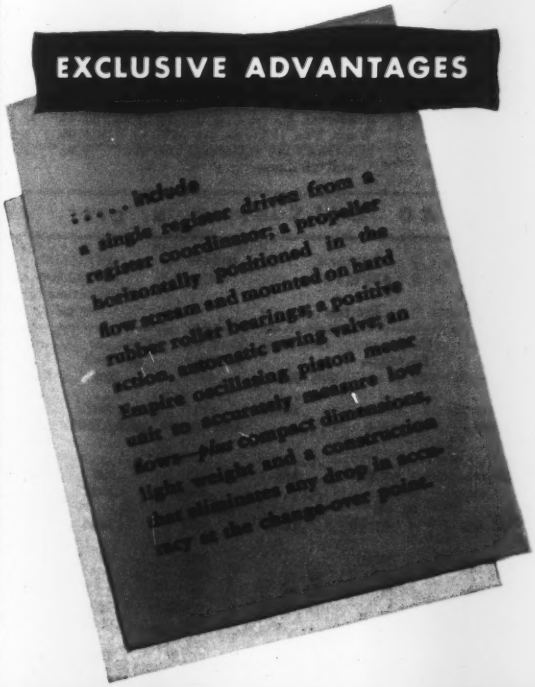
(*Continued on page* 154)

I'm glad I'm single!



I'm the Pittsburgh Empire Compound meter. I have but a *single* register! All other combinations of displacement and propeller meters have *two* registers that must be individually read. These readings must then be added together to arrive at the total measured.

You, too, should be glad I'm single! For I speed meter reading. And my single blessedness eliminates many errors in reading, totaling and recording compound metered volume. The single register is but one of my many exclusive advantages. Want to learn more about me? Then write for bulletin W-803 today!


EXCLUSIVE ADVANTAGES
..... include
a single register driven from a
register coordinator; a propeller
horizontally positioned in the
flow stream and mounted on hard
rubber roller bearings; a positive
action, automatic swing valve; an
Empire oscillating piston meter
unit to accurately measure low
flows—plus compact dimensions,
light weight and a construction
that eliminates any drop in accu-
racy at the change-over point.

ROCKWELL

PITTSBURGH EQUITABLE METER DIVISION
Rockwell Manufacturing Company
Pittsburgh 8, Pa.

Atlanta Boston Chicago Houston Kansas City Los Angeles
New York Pittsburgh San Francisco Seattle Tulsa

PITTSBURGH-EMPIRE *Compounds*

MATERIALS AND LABOR PRICES

Market quotations on construction materials and wage rates reported monthly by ENR correspondents
February Materials and Labor Prices will appear in the February 5, 1948 issue.
Mexico City, Mexico prices are published in this section of Engineering News-Record each month.

CEMENT, AGGREGATE, READY-MIXED CONCRETE — F. O. B. CITY

	PORTLAND CEMENT* Per bbl. C/L lots incl. $1.00 per bbl. for bags, cash. dis. not deducted			SAND AND GRAVEL Per ton, carload lots			CRUSHED STONE Per ton, carload lots		CRUSHED SLAG Per ton, carload lots, f.o.b. plant		CONCRETE BLOCK 8x8x16-in.; truckload del.; per block		Ready Mixed 1:2:4 mix per c.y. del.
	Cloth	Paper	Bulk	Gravel, 1½ in.	Gravel, ¾ in.	Sand	1½ in.	¾ in.	1½ in.	¾ in.	Sand grav.	Lt.wgt.Agg.	500 c.y. jobs
Atlanta	$3.87	$3.07	$2.82	$2.00	$2.00	$1.75	$2.10	$2.10	$1.65	$1.85	$0.1725	$0.1725	$11.00
Baltimore	3.71	2.91	2.66	2.10*ff*	2.10*ff*	1.60*ff*	2.25*ff*	2.35*ff*	2.20*ff*	2.20*ff*	.145	.145*w*	8.55
Birmingham	3.55	2.75	2.45	2.06	2.06	1.63	2.50	2.50	1.00	1.20	.15	.15	6.95
Boston	4.13	3.33	3.08	1.50‡*t*	1.50‡*t*	1.40‡*t*	1.25‡*t*	1.35‡*t*	....	....	.186	.195*w*	9.40*m*
Chicago	3.65	2.85	2.60	2.60‡*d*	2.60‡*d*	2.85‡*d*	2.60‡*d*	2.60‡*d*	2.00‡	2.00‡	.20	.20*x*	....
Cincinnati	3.69	2.89	2.64	1.70‡*bb*	1.70‡*bb*	1.60‡*bb*	2.75‡*bb*	2.75‡*bb*	....	....	.17	.195	9.00*hh*
Cleveland	3.64	2.84	2.54	1.90*lliq*	1.65*llq*	1.25*ll*	3.20‡*h*	3.20‡*h*	2.45	2.45	....	.20	10.40*ss*
Dallas	3.57	2.72	2.47	2.00	2.15	1.75	2.00	2.10	....	....	.0775*p*	....	8.85
Denver	4.03	3.23	2.98	1.85	2.00	1.15	....	....	....	....	.2245	.2245*w*	10.00
Detroit	3.54	2.74	2.49	3.00‡	3.00‡	2.75‡	2.75‡	2.75‡	2.75‡	2.75‡	.17*w*	.18*w*	9.15*kk*
Kansas City	3.68	2.88	2.63	1.90	1.90	1.40*t*	1.45*q*	1.45*q*	....	....	.16*uuf*	.175*uy*	9.60*m*
Los Angeles	3.90*eeb*	3.40*b*	3.05*b*	1.92*t*	2.02*t*	1.72*tnn*	1.92*t*	1.92*t*	....	....	.08*oo*	....	9.30*m*
Minneapolis	3.85*dd*	3.05*dd*	2.80*dd*	2.10*h*‡*j*	2.10*h*‡*j*	1.20*h*‡*j*	2.20*h*‡*j*	2.20*h*‡*j*	....	....	.19*cco*	....	10.05*kk*
Montreal	....	2.17*r*	2.02*r*	1.78*bbs*	1.78*bbs*	1.10*s*	.95*cs*	1.05*cs*	....	....	.1391	.1515*w*	7.75*s*
New Orleans	3.43	2.58	2.33	2.13	2.13	1.67	....	....	.90	1.15	.23	....	10.65
New York	4.75‡	3.75‡	....	1.85*de*	1.85*de*	1.30*de*	2.00*de*	2.00*de*	....	....	.16/.18*ii*	.16/.18*uccii*	9.90*k*
Philadelphia	3.52‡	2.72‡	2.47‡	2.20‡	2.30‡	2.05‡	1.90‡	1.95‡	1.50	1.50	.20/.22	.20/.22*w*	9.25
Pittsburgh	3.51	2.66	2.41	2.05‡	2.05‡	2.35‡	2.50‡	2.50‡	2.05	2.05	.22*z*	.22*z*	10.85
St. Louis	3.66*o*	2.86*o*	2.61*o*	2.25‡*oh*	2.25‡*oh*	2.00/2.25‡*oh*	1.35*c*	1.35*c*	1.15	1.15	.195	.22*yo*	10.15
San Francisco	....	3.04	2.64	1.71	1.71	1.81	1.81	....	....	....	....	.25*y*	9.92*k*
Seattle	....	3.20*mm*	2.80*mm*	2.50‡*od*	2.50‡*od*	2.50‡*od*	3.00‡*od*	3.00‡*od*	....	....	.18*o*	....	9.00*k*

‡ Delivered. *a* F.o.b. truck at plant. *b* 10c. per bbl. off for payment by 10th of following month. *c* F.o.b. quarry. *d* Per cu. yd. *e* Barge lots alongside docks. F.o.b. truck on job. *g* Pea gravel. *h* Truck Lots. *i* ¼ in. *j* 5% discount for cash. *k* Discount of 2 percent for cash in 10 days. *l* 2000 lb. concrete. *m* 50c. off for cash. *n* 25 c.y. or more. *o* 2% off for cash. *p* 5½ x 8 x 12 in. *q* F.o.b. car or truck at plant. *r* 10¢ per bbl. off cash 20 days. *s* 8% sales tax included. *t* Truck delivery. *u* 10 to 100 c.y. brackets. *w* Cinder. *x* Waylite. *y* Haydite. *z* Celocrete. *aa* Aver. haul, 7–9 mi. zone. *bb* 5 tons or more. *cc* Also 8 x 8 x 18 in. *dd* Dealers sell only in LCL. This is price for CL and does not include dealer's commission. *ee* 20c refund for each returnable bag. *ff* LCL. *gg* 10c. refund for each returnable bag. *hh* Truck loads up to 500 c.y. Over 500 c.y lots, 50¢ less per yd. *ii* Yard price. *kk* 2500 lb. compression strength *jj* 30¢ refund for each returnable bag *ll* Price at plant, called for. *mm* 10¢ per bbl. off cash 10 days. *nn* Concrete sand *oo* 4x8x12 std. wgt. * Prices include dealer's commission except where indicated to the contrary.

CASH DISCOUNTS CEMENT to Contractors: truck delivery, 2% for cash on 10th of month; on carload deliveries, no trucking, same as dealer cash discount 10c. per bbl. for payment within 15 days of date of invoice. Subject discount 10c. per bbl. 20 days in Montreal.

CURRENT MAXIMUM PRICE BASES AT CEMENT MILL

Charge for bags not included. For cloth bags, add $1.05 per bbl.; 25c. refund allowed for each returnable bag; for paper bags add 25c. per bbl., not refundable.

	Bagged	Bulk		Bagged	Bulk		Bagged	Bulk
Buffington, Ind.	$2.10	$2.10	Ironton, Ohio	$2.05*	$2.05*	Universal, Pa.	$2.10	$2.10
Hannibal, Mo.	2.10	2.10	Northampton, Pa.	2.00	2.00	Waco, Tex. (Plus 9c. tax in Tex.)	1.95	1.95
Independence, Kans.	2.10	2.10	Richard City, Tenn.	2.10	2.10	Montreal City (Discount 10c. per bbl. 20 days)	1.88	1.88
* Destination price base effective Aug. 14, 1947			Steelton, Minn.	2.20	2.20			

PAVING BRICK, BLOCK, ASPHALT, ROAD OILS — F. O. B. CITY

	PAVING BRICK AND BLOCK			PAVING ASPHALT Per ton, less than 80 penetration		ASPHALT BINDERS—FLUXES Per gal., 80–300 penetration		CUTBACK ASPHALT Per ton		ROAD OIL Per gal.	ASPHALT EMULSION (Quick-breaking) Per gal.	
	Granite per M lots of 50,000 4x4x8 in.	Brick per M 3x4x8½ in. carload lots	Wood per sq. yd. 3½ in. 16-lb. treat	Tank car	Drums	Tank car	Drums	Tank car	Drums	Tank car	Tank car	Drums
Atlanta	$73.00	$35.00	$2.25	$14.00	....	$0.074	....	$0.0806*h*	....	$0.0781	$0.0806	....
Baltimore	150.00‡	52.70‡	....	15.00	$21.00	.0775	$0.1075	13.00	$23.00	.10	.075	$0.11
Birmingham	....	32.00	....	....	....	....	....	....	....	....	....	....
Boston	85.00	59.00	3.75	17.00*o*	29.50*o*	.0723*o*	.1447*o*	.075*ho*	.15*ho*	.07*o*	.0907*o*	.18*o*
Chicago	150.00‡*y*	75.00/80.00*e*‡	2.97/4.10*d*‡	22.50*b*	32.00*b*	21.50*bg*	31.00*bg*	.097/.10*bh*	....	.082/.0845*b*	.0925/.1025*b*	.14/.165*b*
Cincinnati	....	....	....	19.40*s*	....	....	....	....	....	....	....	....
Cleveland	186.52	47.00*t*	3.77	24.50	36.00	24.50*g*	36.00*g*	.105*h*	.24*h*	.11	.135	.24
Dallas	*l*	40.00	*l*	23.38	....	.0987	.1837	26.15	....	.0962	.1037	....
Denver	....	38.00	....	....	....	....	....	23.50	....	20.00*g*	....	....
Detroit	....	63.00*z*	....	20.00	26.00	18.40*g*	24.40*g*	.0811*h*	.128*h*	.075	.1085	.1322
Kansas City	....	40.00	....	17.60	....	16.00*g*	....	.075*h*	....	.0675	.09	....
Los Angeles	*l*	....	*l*	14.00*bf*	30.75	14.00*g*	30.75	14.50*b*	31.25	.04*b*	.10*b*	.20*b*
Minneapolis	....	....	2.74*d*	26.00	35.00	20.00*g*	31.00*g*	26.00	37.00	.10	.12	.22
Montreal	125.00	....	....	21.60*k*	31.25*k*	14.10*kp*	18.35*kp*	14.00*kp*	16.00*kp*	.125*kj*	.153*k*	.194*k*
New Orleans	....	....	....	20.00*a*	.....*s*	20.00*ga*	.....*s*	9.50*a*	.....*s*	.095	.0975	.16*a*
New York	....	....	2.40/2.50*d*	25.95	36.35	24.95*g*	42.79*g*	.1068*h*	.1832*h*	.1018	.1066	.1808
Philadelphia	150.00	62.00	4.06	19.00	....	17.00*g*	....	.08*h*	....	....	....	....
Pittsburgh	165.00	42.00	4.10	22.00	34.00	.11	.20	23.00	36.00	.09	.10	.20
St. Louis	....	48.50	....	16.50/17.50	22.50/23.00	15.50/16.00*g*	21.50/22.00*g*	.075/.08*h*	.165/.17*h*	.065/.07	.075/.095	.125/.155
San Francisco	....	54.00*c*	....	14.50	31.75*w*	14.50*g*	....	15.00	....	....	.0575	.1275
Seattle	....	....	....	14.50*i*	31.00*i*	13.00*ig*	....	15.00*i*	19.00*aai*	14.00*ig*	.0625*i*	.0725*i*

‡ Delivered. *a* F.o.b. Baton Rouge. *b* F.o.b. Refinery. *c* 2½ x 8½ x 4 in. *d* 2-in. interior block, 6-lb. treatment. *e* 3½ x 4 x 8½. *f* 40–300 penetration. *g* Per ton. *h* Per gallon. *i* F.o.b. Martines. *j* Shipped in drums. *k* Tax included. *l* Not used. *n* 55 gal. drums. *o* Price at plant. *p* Per 100 gal. *s* Drums not available. *t* Truck deliveries in Greater Cleveland. *w* Shipped in double head wood barrels. *x* Truck deliveries in Detroit $75.00. *y* Carload lots. *z* 50–300 penetration. *aa* In customer's drums. † Correction: Unchanged from Nov. price.

IRON AND STEEL PRODUCTS — BASE MILL PRICES

	STRUCT. SHAPES—PLATE[f]	REINF. BARS billet [be]	RIVETS ½-in. structural[f]	WIRE NAILS Base [df]	SHEET PILING Base[f]	STEEL RAILS Per Net Ton Standard	Light	Re-rolled	TRACK SUPPLIES[f] Angle Bars	Std Spikes [e]	Tie Plates [e]	Track Bolts
Birmingham	$2.80	$2.75	$5.65	$4.25/5.00	....	$55.00	$62.00	Not	$3.25	$4.85	$3.05	$7.00
Chicago	2.80	2.75	5.65	4.25/5.00	$3.30	.....	.....	avail-	3.25	4.85	3.05	7.00
Pittsburgh	2.80	2.75	5.65	4.25/5.00	3.30	55.00	62.00	able	3.25	4.85	3.05	7.00
Buffalo	2.80	2.75	....	....	3.30	.....	.....	....	....	....	3.05	....
Cleveland	....	2.75	5.65	.. 4.35	....	.....	.....	....	....	....	....	....
Youngstown	....	2.75	....	....	....	.....	.....	....	....	4.85	....	....
Detroit	....	....	....	....	....	.....	.....	....	....	....	....	....
Gulf ports	.....	....	....	....	....	.....	.....	....	....	....	....	....
Geneva	2.975‡	....	....	....	....	.....	.....	....	....	....	....	....
Los Angeles	3.41/3.47‡	3.325‡	....									

‡ Delivered. *b* Rail steel price upon application. *c* Other basing points include Portsmouth, O., Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., and Pacific coast ports. On tie plates alone, Steelton, Pa.; on spikes alone, Lebanon, Pa., Richmond, Va. *d* Add switching charge $18 per CL. *e* Mill lengths. Add 50¢ for cut lengths. *f* Per 100 lbs.

IRON AND STEEL PRODUCTS — F. O. B. WAREHOUSE, PER 100 LBS., BASE PRICE

	STRUCTURAL SHAPES Per 100 lb. base price	REINFORCING BARS[g] Per 100 lb., base price [u] 5 tons to carload lot [b] New billet	Rail steel	Add Switch	$/cwt. for Del.	EXPANDED METAL LATH[k] Per 100 sq. yd., carload lots Std. diamond mesh, 3.4 lb.	Std. ribbed, 3.4 lb.	WELDED FABRIC REINFORCING Per 100 sq. ft., carload lots 4x16 in., No. 5 & 10 wires	4x12 in., No. 8 & 12 wires	6x6 in., No. 6 & 6 wires	SHEET PILING Per 100 lb. base price.
Atlanta	$5.12‡	$5.12‡	$5.12‡	$.025	$.10	$31.00	$33.00	....	....	....	....
Baltimore	4.68	3.96[t]	....	....	.10	33.50	35.50	$2.40	$1.66	$2.52	$4.25
Birmingham	4.10	4.25	4.25	.05	.10	37.50[p]	40.50[p]	....	....	....	....
Boston	4.92‡	4.65‡	4.096[a]	....	.10/.15	29.00	31.00	2.48	1.71	2.60	3.753[k]
Chicago	4.40	3.50[ff]	3.50[ff]	.05	.05	27.00‡	29.00‡	....	....	....	3.30[z]
Cincinnati	4.79‡	3.819[c]	3.819[c]	....	....	29.00[zeegg]	31.00[zeegg]	....	....	....	3.64[d]
Cleveland	4.65	3.39[c]	....	....	.10	29.00	31.00	....	....	....	....
Dallas	6.72	5.50†	5.50†	....	....	32.50	35.00	....	....	....	....
Denver	5.28	5.80[c]	....	....	....	40.00[s]	45.50[qs]	....	....	....	5.70
Detroit	4.77‡	4.58	4.58	....	.10	33.00[x]	35.00[q]	....	....	....	3.6512[gd]*
Kansas City	5.15[ee]	4.23[aak]	4.23[aak]	....	.10	34.00	36.00	....	....	....	3.828[k]
Los Angeles	5.15[f]	4.43	....	....	....	30.50	32.50	....	....	....	....
Minneapolis	4.78‡	5.056[cen]	5.056[ccn]	....	.15	29.50[k]	31.50[k]	....	....	....	3.817[k]
Montreal	4.90[i]	4.25[i]	4.25[i]	....	....	40.28[A]	42.98[A]	....	....	....	78.70[jd]
New Orleans	....	4.64[ok]	....	.05	.10	27.50	29.50	....	....	....	....
New York	4.52[r]	4.50	....	....	.15/.20	30.00[st]	32.00[st]	2.44	1.68	2.56	3.35[a]
Philadelphia	4.52	4.55	....	....	....	30.00‡	32.00‡	2.41	1.67	2.53	3.41
Pittsburgh	4.40	4.40	4.40	.05	.10	32.50	34.50	2.24	1.56	2.35	5.05
St. Louis	4.73‡	3.92c†	3.92c†	....	.05	38.00‡	40.00‡	....	....	....	....
San Francisco	5.10	4.53†	....	....	....	32.50	34.50	....	....	....	4.85
Seattle	3.628[e]	4.43[el]	....	....	....	35.00[w]*	38.50[w]*	....	....	....	4.355[ld]

‡ Delivered. *a* Mill prices. *b* 1–5 tons, add 35c. Less than 1 ton, add 50c. *c* 20 tons or over base. *d* Mill price plus freight. *e* F.o.b. plant *f* Includes delivery in free delivery zone. *g* High scrap steel prices cut former 15c. differences between new billet and rail steel. *h* List price. Dominion tax exempt. Provincial and Municipal tax extra. *i* Plus Dominion, Provincial and Municipal sales tax. *j* Price per ton. *k* F.o.b. city. *l* Intermediate. *m* Per sq. yd. *n* 5 to 8 tons base. *o* 5 to 15 tons base. *p* Del. of 5000 sq. yd. or less. *q* Std. ribbed. 4 lb. per sq. yd. *r* 5 tons or over. *s* LCL. *t* Asphalt coated. *u* Note: Revised size extra—1 in., 1¼ in., 1½ in. 10¢, ¾ in., ⅞ in. 15¢, ⅝ in. 20¢, ½ in. 35¢, ⅜ in. 55¢, ¼ in. $1.30. *v* Under 20 tons. Straight. *w* Copper bearing. *x* 2.5 lb. per sq. yd. *y* $.0093 transportation tax included. *z* Copper alloy. *aa* 20 tons base. *cc* F.o.b. cars Chic. plus freight. *dd* F.o.b. dock. *ee*F.o.b. cars. *ff* Carload lots. *gg* Unchanged since Sept. comparable Aug. std. diamond mesh price was $26; std. ribbed, $28. † Price includes quantity charge and size charge of 15¢ per cwt. for ¾". * Correction: Dec. prices LCL.

PLUMBING, HEATING, WATER, SEWER AND DRAIN PIPE

	C I PIPE Per net ton f.o.b. 6 in. to 24 in. [a]	VITRIFIED SEWER PIPE Per foot, Delivered ASTM C13–44T std. 8 in. s.s.	std. 12 in. s.s.	24 in.	36 in.	CLAY DRAIN TILE ASTM C4–24 Per 1,000 ft., carload lots, f.o.b. 6 in.	8 in.	CONCRETE SEWER PIPE Per ft., delivered; ASTM C 14–41 12 in.	24 in.	WROUGHT STEEL PIPE** (Full standard weight, f.o.b. destination [s]) 2½ & 3 in., Butt Weld Black %	Galv. %	3½ to 6 in., Lap Weld Black %	Galv. %
Atlanta	$80.31	$0.43	$0.67	$3.39	$7.00	$114.00	$140.00	$0.45	$2.00	50.7	36.2	46.7	31.7
Baltimore	84.56	.378	.729	3.105	8.098	147.00	228.00	.80	2.20	54.4	39.9	50.4	35.4
Birmingham	74.50	.375	.675	3.06	....	210.00‡	375.00‡	.75	2.00	50.7	36.2	46.7	31.7
Boston	87.42	.392[usz]	.756[usz]	3.465[usy]	8.7125[usy]	150.60	233.40	1.03[ycc]	2.75[ycc]	52.7	38.2	48.7	33.7
Chicago	86.12	54	1.04	4.12	12.80	150.00‡	270.00‡	.65	2.25	56.5[t]	42.0[t]	51.5[t]	36.5
Cincinnati	84.80	406	.783	4.00	12.00	155.00‡	240.00‡	.60	2.25	54.9	40.4	50.9	35.9[t]
Cleveland	86.64	.329[x]	.6345[x]	2.79[x]	7.893[x]	135.50	212.00	.58	2.25	57.15	42.65	53.15	38.15
Dallas	88.56	.375	.675	2.70	6.20	109.00	131.00	.45	1.45	48.8	34.3	44.8	29.8
Denver	93.88	.40[dd]	.71[dd]	2.98[dd]	....	.....	.....	.74[dd]	2.50[dd]	46.9	32.4	42.7	27.7
Detroit	86.64	.51	.98	4.31	10.79	170.00‡[m]	260.00‡[m]	.50	1.90	55.4	40.9	51.4	36.4
Kansas City	87.83	.39[m]	.705[m]	2.78[m]	7.15[m]	180.00[m]	310.00[m]	.50[t]	1.70[l]	52.2	37.7	47.8	32.8
Los Angeles	100.90	.414‡	.894‡	4.347	10.868	220.00	360.00	.65	...	....	....	....	....
Minneapolis	90.01	.55[mo]	1.05[mo]	4.10[mo]	....	.....	.....	1.05[h]	2.90[h]	52.3	37.8	47.9	32.9
Montreal	78.20	.73[s]	1.28[s]	4.20[s]	6.80[es]	.60[paa]	.68[paa]	72.00[jksa]	218.00[jkhaa]	....	....	....	....
New Orleans	82.95	.412	.762	3.955	9.15	231.00[bb]	.....	.55	1.95	50.3	35.8	46.3	31.3
New York	83.68	.59	1.09	4.24	10.79	.....	.....	1.00	2.25	53.7	39.2	49.7	34.7
Philadelphia	81.92	.50	.95	3.95	9.75	220.00‡	275.00‡	1.05[h]	2.75[h]	54.2	39.7	50.2	35.2
Pittsburgh	87.17	.364[m]	.702[m]	2.70[m]	6.625[m]	130.20	197.40	1.05[h]	2.50[q]	57.5[t]	42.0[t]	53.5[t]	38.5[t]
St. Louis	84.27	.40	.72	....	....	.....	.....	1.10[il]	2.25[il]	54.1	39.6	49.2	34.2
San Francisco	100.90	.438[d]	.878[d]	3.69[d]	9.23[d]	169.00[dl]	265.00[dl]	.69	2.85	....	....	....	....
Seattle	102.88	.45[b]	.81[b]	....	....	72.50[e]	.....	.595	1.80	....	....	....	....

‡ Delivered. † F.o.b. *a* B. & S. class B and heavier, CL, Burlington, N. J. (base) $79.50. Based on existing freight rates; subject to rate change. Gas pipe and class A, $5 per ton additional. 4 in., $5 per ton additional. 30 in. and larger, usually $1 per ton less. *b* Extra strength ASTM C 200–44T. *c* 4-in. *d* 88361-A. *e* 30 in. *g* Culvert pipe. Reinforced, ASTM C76–41. *h* Reinforced. ASTM C75–41. *i* Reinforced. ASTM C76–37. *j* Centrispun. *k* Per 100 ft. *l* F.o.b. plant. *m* Truck delivery. *o* Listed price is based on LCL (no minimum). *p* Less than 5 ton loads, price per ft. *s* Discounts from standard list consumers carload prices. Base price approx. $200 per net ton. List prices per ft.: ½ in., 8½c.; ¾ in., 11½c.; 1 in., 17c.; 2 in., 37c.; 2½ in., 58½c.; 3 in., 76½c.; 4 in., $1.09; 6 in., $1.92; 3 percent tax on transportation costs not included. *t* Within switching limits. *u* ASTM C13–40. *v* F.o.b. city, N. J. *x* 2 ft. lengths. *y* 3 ft. lengths. *z* CESA A60–1941 specifications used.. *aa* No standard specifications in Can. *bb* Freight allowed to destinations in city. *cc* Truck loads; f.o.b. plant. Newton. *dd* LCL. delivered. f.o.b. truck. ** Recent 10% emergency freight rate increment granted railroads on Oct. 13 not included.

WROUGHT IRON PIPE: List prices per ft. same as wrought steel pipe. Discount for Pittsburgh base. Butt weld — 1 in. and 1¼ in. black, 34 galv., 16; 1¼ in. black, 38 galv., 18½; 2 in. black, 37½, galv., 18. Lap weld — 2½ in. to 3½ in. black, 31½, galv., 14½; 4½ in. to 8 in. black, 32½, galv., 17. Freight rates to destination to be added to name delivered price.

LUMBER, TIMBER, PLYWOOD—PER M FT., B.M., CARLOAD LOTS F. O. B.

	SHORT LEAF YELLOW PINE AND DOUGLAS FIR — All S. L. Y. P. is No. 2 common or better and for No. 1 N. C. Box. (Prices in Bold Face) — All Fir planks No. 2 common, Fir timber is No. 1 common. Lengths up to 20 ft. (Prices in italics)									LONG LEAF Y. P. Merchantable grade up to 20 ft.		PLYWOOD Rail freight increment* (See note for base price)	
	1x6 s4s	1x8 s4s	2x4 s4s	2x6 s4s	2x8 s4s	2x10 s4s	3x12 Rgh	6x12 Rgh	12x12 Rgh	2x12 Rgh	12x12 Rgh	3/8"	1/4"
Atlanta	$80.00	$82.00	$70.00	$70.00	$75.00	$76.00	$80.00					$20.46	$24.97
	95.00	95.00	96.50	96.50	96.50	96.50	87.50	$87.50	$87.50				
Baltimore	96.00	96.00	96.00	95.00	100.20	104.00	115.00			193.60	182.00	20.96	25.58
	106.00	108.00	112.30	112.00	114.00	114.00	121.00	121.00	121.00				
Birmingham	87.50	87.50	87.00	86.00	87.00	90.00	110.00			110.00	112.50	19.97	24.37
	92.50	92.50	92.00	91.00	92.00	95.00	114.00	97.00	98.00				
Boston	70.00[a]	72.00[a]	66.50[a]	68.50[a]	70.50[a]	74.50[a]	70.25[a]					20.96	25.58
	84.75i	84.75i	82.75i	83.25i	82.75i	82.75i	80.50i	89.50i	89.50i	89.50i	89.50i		
Chicago ‡	100.00	104.00	93.00	93.00	93.00	100.00	100.00			125.00	125.00	17.16	20.90
‡	108.00	108.00	100.00	100.00	100.00	105.00	105.00	105.00	105.00				
Cincinnati	89.00	91.00	90.00	88.00	90.00	92.00				100.00	135.00	19.97	24.37
Cleveland k	110.00	120.00	120.00	120.00	120.00	125.00	130.00			130.00	130.00	20.35	24.86
k	115.00	130.00	130.00	130.00	130.00	130.00	130.00	130.00	130.00				
Dallas	71.00	71.00	61.00	59.00	61.00	66.00	80.00			72.00	80.00	17.16	20.90
Denver	95.00	95.00	96.50	96.50	96.50	98.50	105.00	110.00				12.76	15.57
Detroit	98.00	98.00	90.00	90.00	95.00	93.00	93.00			90.00	105.00	19.97	24.37
	98.00	98.00	92.00	92.00	98.00	96.00	100.00	100.00	105.00				
Kansas City a	105.00	110.00	100.00	100.00	100.00	100.00						15.18	18.48
	105.00	110.00	100.00	100.00	100.00	100.00	105.00	120.00	120.00				
Los Angeles a	103.00	103.00	103.00	102.00	102.00	102.00	108.00	115.00	105.00			12.27gh	14.91gh
Minneapolis ‡b	112.00[a]	112.00[a]										15.18	18.48
‡b	108.00	108.00	108.00	108.00	108.00	110.00	130.00	130.00	130.00				
Montreal c[d]	73.00	76.00	70.00	72.00	76.00	85.00							
	111.55	111.55	111.55	111.55	111.55	111.55	120.00	87.00					
New Orleans	90.00	90.00	84.00	82.00	84.00	86.00	90.00			100.00	105.00	17.16	20.90
	68.00	68.00	70.00	67.00	67.00	67.00	71.00	90.00	110.00				
New York ‡	110/115	110/115	Range from $95.00 to $97.50				115/125			175/200†	175/200†	20.96	25.58
‡			Range from $120.00 to $130.00				a	120/130	120/130				
Philadelphia			Range from $100.00 to $110.00										
			Range from $110.00 to $120.00										
Pittsburgh	75.00	77.00	80.10	80.10	83.25	89.70	107.75			130.60	141.00	20.68	25.19
	93.60	93.60	83.00	83.00	87.00	91.00	110.00	118.00	118.00				
St. Louis ‡j	105.00	105.00	100.00	100.00	105.00	108.00	115.00					17.16	20.90
‡j	115.00	115.00	120.00	120.00	120.00	120.00	125.00	140.00	140.00				
San Francisco d	76.50	76.50	76.50	76.50	76.50	74.50	74.00	74.00	74.00			9.24g	11.28g
Seattle	70.00i	70.00i	70.00i	70.00i	70.00i	70.00i	75.00i	75.00i	75.00i				

Bold Face type, Southern Pine. *Italics, Douglas Fir.* [a] Spruce. [b] Western Pine, No. 3 Common. [c] Norway Pine. ‡Delivered. *a* Yard prices. *b* Retail prices, less than CL. *c* 5 M ft. or less. *d* Sales through wholesale distribution yard (F.o.b. purchaser's truck or carrier, San Francisco paid). *e* Tax exempt. *g* Lower rate by water shipment. *h* 50,000 lb. minimum. *i* No. 1 common. *j* Delivered in 5000 ft. lots. *k* These are retail yard prices quoted per truckload in Greater Cleveland. Less 2% for cash. Truck lots.

Note: Special concrete form grade Fir Plywood, 4' by 8' panels, 5-ply, sanded 2 sides, water resistant glue, carload lots, delivered per 1,000 sq. ft. surface. Seattle base price on ⅜", $151.00; on ¼", $171.00. For other centers add rail freight increment from table on proper size. For oiling add $3.00; for edge sealing add $2.00; for resin sealing add $8.50.

* Freight rates include 10% emergency increase granted railroads on Oct. 13

†18 ft. and under.

GLASS, EXPLOSIVES, CHEMICALS

	WINDOW GLASS — Discounts from jobbers list, Jan. 16, 1946 — Single or Double Thickness — A quality	B quality	EXPLOSIVES — Per lb. 40% Ammonia Gelatin in 50 lb. cases delivered in 200 lb. lots*	
Atlanta	76%	76%	$0.195	
Baltimore	70–10%	71–10%	.195	
Birmingham	68%	68%	.15	
Boston	77%	78%	.195	
Chicago	68%e	68%e	.195	
Cincinnati	67&10%g	67&10%g	.195	
Cleveland	67–10–10%	67–10–10–10%	.235	
Dallas	67%e	68%e	.2075	
Denver	68%	68%	.20	
Detroit	77%	76%	.195	
Kansas City	68-10%g	68-10%g	.20	
Los Angeles	63%	68%h	.2025	
Minneapolis	68%	68%	.20	
Montreal	40%ab	40%ab	18.25i	
New Orleans	68%	68%	.205	
New York	73%	74%	.265f	
Philadelphia	69%	70%	.195	
Pittsburgh	70–10%	70–10%	.1675	
St. Louis	70–10%	70–10%	.20	
San Francisco	66%	73%	.20	
Seattle	59%	60%	.2025	

Price of 60% Ammonia Gelatin is $0.0125 per lb. higher than 40%

a Discount from list, Sept., 1939; sales tax included, but 6% tax exemption not allowable for. *b* Single thickness. *d* Discount from jobbers list Sept. 15, 1928. *e* Discount from list of Jan. 29, 1947. *f* In borough of Kings, Queens and Richmond, and in Manhattan south of Canal St., add delivery charge of $9.00 per trip. *g* Discount from list of Aug. 15, 1938. *h* Single thickness. Double thickness, 67%. *i* F.o.b. city, per 100 lb. forcite 40%; 60%, $20.00

* Urban prices influenced by service charges or local storage and delivery regulations do not consistently reflect quantity prices in less congested areas

40% Ammonia Gelatin price ranges in other than urban areas, per lb. (except Seismograph Grades)

	C/L 20,000 lb. net	Tons	200 lb. lots
E. of the Miss., except Fla. and Me.	$0.15	$0.175	$0.195
W. of Miss. to Rocky Mtn. States, Fla. and Maine	.155 –.1625	.18 –.1925	.20 –.2125
Rocky Mtn. States	.155 –.1675	.18 –.1975	.20 –.2175
Pacific N. W. States	.1525–.165	.1825–.195	.2025–.215
Pacific S. W. States	.15 –.1575	.18 –.1875	.20 –.21

PILES, TIES F. O. B.

PILES

Prices per linear foot, fir and pine, bark on, f.o.b. cars, New York. Fir based on Wash. and Ore. points to New York shipping area; pine based on freight from Norfolk.

Dimensions	Points	Length	By Rail — Pine*	Fir
12-in. at butt	6-in.	30 to 50-ft.	$0.34	....
12-in.— 2-ft. from butt	6-in.	50 to 59-ft.	.35	....
12-in.— 2-ft. from butt	6-in.	60 to 69-ft.	.36	....
12-in.— 2-ft. from butt	6-in.	90 to 100-ft.	....	.62
13-in.— 3-ft. from butt	5-in.	91 to 100-ft.	....	.63
14-in.— 2-ft. from butt	6-in.	50 to 69-ft.	.41	.70
14-in.— 2-ft. from butt	6-in.	70 to 79-ft.	.43	.64
14-in.— 2-ft. from butt	5-in.	80 to 85-ft.	.54	.65
14-in.— 2-ft. from butt	5-in.	85 to 89-ft.	.57	.66
14-in.— 2-ft. from butt	5-in.	90 to 100-ft.	....	.70

* Pine piling over 80-ft. available only in limited quantities.

RAILWAY TIES

Prices f.o.b. per tie for carload lots:		6"x8"x8' Untr.	6"x8"x8' Tr.	7"x9"x8'6" Untr.	7"x9"x8'6" Tr.
Boston	Oak	$1.45	....	$2.00	....
	Pine	1.35	$3.05a	1.90	$4.00a
New York	S. L. Sap Pine	1.65	2.85	2.00	3.20
	Mixed Oak	1.80	3.05	2.50	3.60
Birmingham	Hardwood	1.00	1.60a	....	2.25a
Chicago	Red Oak	....	2.35/2.45a	....	3.25/3.40a
Los Angeles	Douglas Fir	1.86	2.82a	....	....
Philadelphia	Red Oak	2.25	3.05ag	3.00	4.15ag
St. Louis	White Oak	1.80	....	2.50	....
	Red Oak	....	2.40a	....	3.40a
	Sap Pine or Cypress	2.20	....	....	....
San Francisco	Douglas Fir	1.60ef	2.80f	2.10bf	3.88ef
Montreal	Birch or Maple	....h	....h	....h	....h

Tr.— Treated; Untr.— Untreated. *a* Creosoted. *b* 7" x 9" x 8'. *c* Empty cell. *e* Green. *f* F.o.b. cars. *g* January, 1943 price, none later available. *h* No constant price available.

CHEMICALS

Water, sewage treatment, road work, f.o.b. carlots, New York

Bleaching powder in drums f.o.b. works, per 100 lb.	$3.75
Chlorine cylinders, liquid, per lb. delivered	.07–.12
Calcium chloride, 77–80%, flaked, 100-lb. paper bag, del'd, ton	21.50–38.00
Silicate of soda, 52 deg., in drums, f.o.b. works, per 100 lb.	1.65
Soda ash, 58%, in paper bags, per 100 lb. dense	1.38
Sulphate of aluminum, commercial, in 100-lb. bags	1.15–1.30
Sulphate of copper, in bbls., per 100 lb.	7.60

STRUCTURAL CLAY BUILDING TILE, BRICK AND LIME — DELIVERED

	STRUCTURAL CLAY TILE PARTITION — SCORED Per M. lots of 2,000 pieces or over, 3x12x12 in.	4x12x12 in	8x12x12 in	STRUCTURAL CLAY TILE — LOAD BEARING — SCORED Per M. lots of 2,000 pieces or over, 8x12x12 in.	10x12x12 in.	12x12x12 in.	BRICK Per M. in quantity Common backing	Straight hard	LIME Per ton. In paper. Carload lot. Hydrated finishing	Common hydrated	Pulverized, or lump
Atlanta	.....	.....	.....	.....	.....	.....	$24.00	$24.00	$19.00	$17.50	$17.50
Baltimore	$120.00	$126.00	$220.00	$240.00	$315.00	$340.00	27.00*k*	32.00*k*	30.00	18.00	.....
Birmingham	97.50	104.00	195.00	231.00	.....	.....	20.00*ff*	22.50*gg*	21.80	17.50	.....
Boston	105.00†	112.00†	210.00†	252.09†	.....	.....	20.00*i*	20.00*i*	21.00†	.....	16.00
Chicago	115.60	122.50	230.00	.....	.....	.....	20.00	21.00	25.00	18.00	.....
Cincinnati	120.00*j*	135.00*j*	170.00*jdd*	280.00*j*	.....	.....	33.00	33.00	25.60	23.20	.....
Cleveland	107.50*ee*	114.50*ee*	210.50*ee*	.....	.....	.....	25.50	25.50	21.15	19.15	23.25*ee*
Dallas	.....	83.00	.....	.....	.....	.....	18.00	20.00	28.00	22.00	.....
Denver	.....	.....	.....	.....	.....	.....	28.50	31.00	34.80*bb*	28.00*bb*	34.00*bb*
Detroit	130.00	145.00	260.00	300.00	380.00	443.00	27.00*f*	29.00*f*	28.00	26.00	26.00
Kansas City	115.00	120.00	190.00	250.00	.....	.....	24.75‡	26.75‡	34.00	30.00	30.00
Los Angeles	*r*	*r*	*r*	*r*	*r*	*r*	24.00	.....	26.00	26.00	27.00
Minneapolis	144.00*p*	160.00*p*	.....	160.00*wp*	.....	.....	23.50*rp*	.....	33.00*bbe*	24.00*bbe*	33.00*bbde*
Montreal	100.00*a*	110.00*a*	206.25*a*	151.50*aa*	.....	294.40*a*	24.00	35.00	12.50*ub*	14.00*u*	8.00*uo*
New Orleans	160.00	160.00	300.00	380.00	411.89	485.91	22.50	.....	21.20	18.00	14.10
New York	103.90	110.80	152.35*c*	166.70*hn*	.....	.....	28.00	.....	33.50	25.50	.....
Philadelphia	112.10	119.60	224.20	269.10	321.20	405.10	24.75	27.75	26.75	17.00	17.00
Pittsburgh	98.50	105.80	181.85	217.30	265.85	303.10	26.00	31.00*y*	20.45	18.65	2.97*m*
St. Louis	106.92	118.00	220.00	231.50	275.00	.....	28.50*nl*	26.50*s*	.72*saap*	.55*saap*	.82*aaspee*
San Francisco	124.00	139.50	186.00*dd*	139.50*t*	.....	.....	27.50	.....	23.35	23.35	2.34*m*
Seattle	137.00*ee*	147.00*ee*	.....	147.00*eew*	.....	.....	28.50*v* ↓	33.50	29.00*shh*	29.00*shh*	3.50*mhh*

† F.o.b. *a* Smooth. *b* Per 50 lb. bags. *c* 6 x 12 x 12 in.-3 cell. *d* Pulverized lot. *e* 5% discount for cash. *f* Includes $3.50 per M for truck delivery. *g* 5½ x 8 x 12. *h* F.o.b. Perth Amboy, N. J. *i* F.o.b. warehouse only. *j* Truck load or over. *k* $1.00 discount. *l* Red face. *m* Per bbl., 180 lb. *n* 7¾ x-7¾ x 12. Speed tile. *o* Per bbl., 200 lb. *p* Truck lots. *r* Not used because of earthquake danger. *s* 2% discount for cash. *t* 5½ x 8 x 11½. *u* Tax exempt. *v* Sand lime. *w* 5 x 8 x 12. *y* Stacked. *z* Pebble lime price per 80 lb. sack. *aa* Price per sack. Lime not sold per ton. *bb* LCL. *cc* Truck delivery. *dd* 6 x 12 x 12. *ee* Pebble lime. *ff* 80% common. *gg* Select. *hh* LCL. ‡ Dec. price was f.o.b. Buffalo, Kan. price.

PAINT, ROOFING — F. O. B. CARLOAD LOTS

	RED LEAD Per 100 lb. in 600-lb. (Approx.) bbl. Dry *a*	WHITE LEAD Per 100 lb. in 100 lb. cases In oil *w*	READY-MIXED PAINT Per gal., drums Graphite *b*	Aluminum *c*	Ferric Oxide *d*	ROOFING SUPPLIES Carload lots f.o.b. factory Rolls, slate surfaced, 85–90 lb. per sq.	Asphalt felt, per 100 lb.	Tar felt, per 100 lb.	Asphalt coating per gal.	Tar pitch 360 lb. bbl. per ton
Atlanta	$18.85	$27.375	$1.75	$2.70	$1.65	$2.06‡	$2.06‡	$2.06‡	$1.00‡	$36.00‡
Baltimore	18.60	27.00	2.25	3.50	2.75	2.50	3.00	3.00	.50	30.00
Birmingham	18.85	27.375	4.40	4.52	....	2.84	2.70	2.70	.40	34.50
Boston	18.60	27.00	1.75	2.50	2.31	2.00‡*h*	3.30‡*q*	3.30‡*q*	.25‡	21.00
Chicago	18.60	27.00	....	....	....	2.50‡	2.63‡*o*	2.65‡*o*	31.00†*bb*	31.00‡
Cincinnati	18.60	27.00	....	3.15	1.90	2.21	2.26*o*	2.26*o*	37	34.00
Cleveland	18.60	27.00	3.00	3.00*a*	3.00	2.21	2.26*o*	2.26*o*	.31*y*	33.00
Dallas	18.60	27.00	....	4.05	....	2.69*q*	3.00*q*	3.15*q*	.90	45.00
Denver	18.60	27.50	2.88	4.38	2.63	2.04*o*	2.24*o*	.....	.42	32.00
Detroit	18.60	27.00	2.25	3.00	2.00	2.25	2.25	2.25	.50	25.00
Kansas City	18.60	27.125	3.30*g*	3.55*g*	3.16*g*	3.00	3.25	3.50	.54	31.00
Los Angeles	18.85	27.50	2.80	4.00	3.50	2.98	2.19*e*	*l*	.77	*l*
Minneapolis	18.60	26.13*m*	.....	.....	....	2.10*im*	2.15*him*	2.15*him*	.37*m*	30.00*rm*
Montreal	.....	17.85	2.90*p*	4.20*p*	3.62*p*	3.14*t*	2.85*tf*	2.30*tf*	.68*t*	2.15*kt*
New York	18.60	27.00	3.45	....	3.45	2.10	2.15*o*	2.15*o*	.30*s*	28.00
Philadelphia	18.60	27.00	2.00	2.40	1.90	2.54	2.94	2.94	.37	26.00
Pittsburgh	18.60	27.00	2.00	2.90	1.90	2.93	3.00*o*	3.00*o*	.37	33.00
St. Louis	18.60	27.00	....	....	....	2.66	2.66	2.66	.38	31.00
San Francisco	18.85	27.25	1.80	2.75*n*	1.35	2.27*x*	3.30*aa*	....	.38*g*	.....
Seattle	18.85	27.50	2.95*m*	2.95*m*	....	3.13*mqcc*	3.17*hmcc*	....	.49*mcc*	35.00*jm*

‡ Delivered. Note: Red lead in oil 50c higher than white lead in oil. *a* Red lead prices change frequently due to pig lead price changes. *b* U. S. War Dept. Spec. 3-49A. *c* ASTM Spec. D266–31. *d* 80% minimum ferric oxide. *e* 15 lb per square. *f* Per 432 sq. ft. *g* 50 gal. drums. *h* Per roll. 65 lb. *i* Minneapolis and vicinity. *j* Asphalt pitch. *k* Per cwt. *l* Not used. *m* 1% discount for cash. *n* May, 1941 price. *o* Per 60-lb. roll. *p* Tax included. *q* Per 90-lb. roll. *r* F.o.b. factory Chicago. *s* ASTM Spec. D266-41. *t* Federal tax included. *w* Price to large paint contractors is $1.25 less. *x* Mineral surfaced. *y* 55-gallon container. *z* Drums. *aa* Approximate cost per 100 lbs. *bb* Roofers coating and cement. Price per ton. *cc* LCL.

SKILLED AND COMMON WAGE RATES — PER HOUR

	Brick-layers	Car-penters	Struct. Iron Workers	Hoisting Engineers	Plas-terers	Electrical Workers	Steam-fitters	Common Labor Building	Common Labor Heavy Const.
Atlanta	$2.25	$1.65	$2.00	$2.00	$2.00	$2.00	$2.00	$0.75	$0.85
Baltimore	2.50	1.95	2.15	2.20/2.40	2.00	2.00	2.00	1.10	1.10
Birmingham	2.25	1.625	1.90	1.60/1.875	2.00	2.00	2.00	.85	.95
Boston	2.15	1.90	2.00	2.25	2.25	2.15	2.00	1.40	1.40
Chicago	2.20	2.15	2.20	2.15	2.225	2.15	2.15	1.50	1.50
Cincinnati	2.25	1.975	2.10	2.00	2.125	2.125	2.125	1.25	1.15
Cleveland	2.25	2.125	2.25	1.875/2.125	2.125	2.125	2.125	1.55	1.40
Dallas	2.25	1.875	2.00	2.00	2.125	2.00	2.125	.95	.95/1.50
Denver	2.25*b*	1.875	1.875*b*	1.875*b*	2.25	2.05	2.05	1.275	1.35
Detroit	2.25	2.025	2.25	2.25	2.25	2.25	2.165	1.425	1.425
Kansas City	2.25	1.90	2.05	1.90/2.125	2.25	2.15	2.125	1.35	1.40
Los Angeles	2.375	1.90	2.10	1.85	2.25	2.15	2.25	1.35	1.35
Minneapolis	2.075	1.80	2.00	1.85	2.25	2.06	2.00	1.30	1.30
New Orleans	1.9375	1.625	1.875	1.75	1.875	2.00	2.05	.90	.90
New York	2.75*b*	2.50*b*	2.75	2.75*b*	3.00*a*	2.25*a*	2.75*b*	1.50	1.50
Philadelphia	2.40/2.50	2.00	2.40	2.25	2.25	2.25	2.25	1.10	1.10
Pittsburgh	2.50	2.25	2.25	2.40	2.25	2.25	2.25	1.30	1.30
St. Louis	2.50	2.20	2.25	2.40	2.25	2.25	2.25	1.35	1.50
San Francisco	2.25	2.00	2.25	2.00	2.25	2.25	2.25	1.40	1.40
Seattle	2.365	2.065	2.265	1.95	2.36	2.265	2.34	1.665	1.50
Montreal*	1.40	1.06	1.11	1.00	1.17	1.11	1.11	.73	.67

a 6 Hr. day. *b* 7 hr. day. * Cost of living bonus now included in basic wage.

MEXICO CITY PRICES

In Pesos, F.o.b. City		Nov. '47	Dec. '47
Common Wages—Building (8 hr. day)	av. per hr.	.57	.57
Common Wages—Heavy Const. (8 hr. day)	av. per hr.	.75	.75
Skilled Labor Wages			
Carpenters (8 hr. day)	av. per hr.	1.25	1.25
Bricklayers (8 hr. day)	av. per hr.	1.25	1.25
Struct. Iron Workers (8 hr. day)	av. per hr.	1.50	1.50
Struct. Steel Shapes 3"-15" x 12 meters	per ton	800.00	800.00
Reinf. Steel, Corr. Rods ⅜" x 12 meters	per ton	1,000.00	1,000.00
½" x 12 meters	per ton	955.00	955.00
⅝" x 12 meters	per ton	940.00	940.00
¾" x 12 meters	per ton	940.00	940.00
⅞" x 12 meters	per ton	930.00	930.00
1" x 12 meters	per ton	925.00	925.00
Gravel, truck load of 3½ cu. meters			
Blue Gravel	per tr. load	33.00	33.00
Rose Gravel	per tr. load	30.00	32.00
Cement, Std. Port. (Tolteca)	per ton	115.00	115.00
Lumber			
Mex. Sacred Fir (Oyamel)	per M ft.	370.00	370.00
1st Class Pine	per M ft.	700.00	700.00
2nd Class Pine	per M ft.	500.00	500.00

ENR Skilled Average: (Bricklayers, Carpenters, Ironworkers) $2.140. **ENR Common Average:** $1.272

All-Welded Vertical Lift Span Replaces Barge Bridge

By V. R. Gorham, Vice President
Cleary Bros. Construction Co.
West Palm Beach, Florida

THE old floating barge that carried highway traffic of State Route 71 across the Intracoastal Waterway at White City, Florida, has been replaced by a modern all-welded steel lift bridge constructed by our company.

The new bridge is designed for H-15 loading and is supported on concrete piles and piers. The overall length is 235′.

A total of 98 reinforced-concrete piles, 18″ square x 44′ long, were cast and driven to form the piers under the towers and the two end bents. Driving of pier piles was done from a barge with a Northwest crane fitted out with leads, using a No. 1 Vulcan Steam Hammer. For steel erection, the crane was fitted with a 95′ boom.

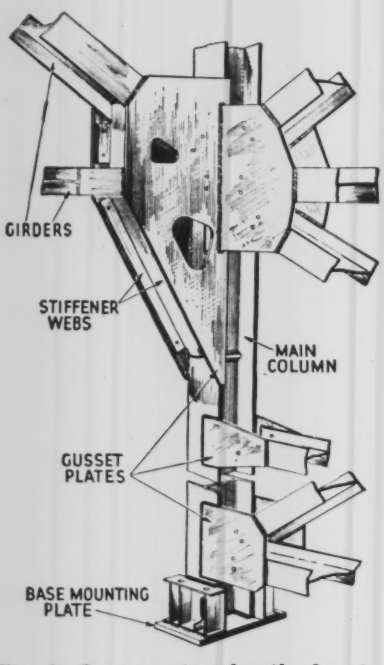


Fig. 1. Construction detail of main column at base foundation showing welded assembly of girders to column.

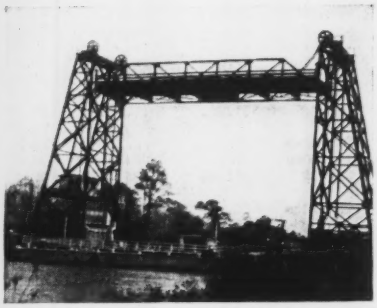


Fig. 2. Modern all-welded construction lift span bridge.

Pier forms were built of ¾″ sheeting with 2 x 6 studs on 16″ centers, and double 2 x 6 wales on 30″ centers for the average panels.

Steel for the towers and lift span was supplied by the Virginia Bridge Co. The two trusses for the 107′ lift span were already assembled when delivered, and the rest of the span welded together at the job site. Timber piles were driven in a nearby inlet, the span assembled and welded on this false-work, and then floated on two barges to its place in the bridge.

The trusses are 12′ 6″ high and are on 33′ 6″ centers. Near the bottom they are connected by 30″ 116-lb. I beams which are spaced 15′ apart and carry 14″ WF stringers. These stringers in turn support a 5″-thick concrete-filled steel deck grating.

The towers consist chiefly of 12″ WF 25 and 40-lb. beams. At the base each tower is 36′ 9″ wide x 28′ long. At the top the width is the same, but the slope on the back members cuts the length down to only 8′.

The weight of the lift span, including flooring and machinery, is 227,870 lbs. Theoretically the counterweights should have weighed half of this, or 113,935 lbs. each. Instead, the counterweights were made to weigh 109,940 lbs. each, with pockets for addition of balance blocks so the most efficient ratio could be worked out in actual tests.

"Fleetweld" electrodes and "Shield-Arc" welders, manufactured by The Lincoln Electric Company were used. The welders were of the engine-driven type with pneumatic tired running gear to provide easy portability.

The construction crew employed on the bridge averaged 23 men, consisting of a crane operator, 2 welders, 5 carpenters, 5 structural steel workers and 10 laborers. Had riveting been used, we would have required about 6 more men.

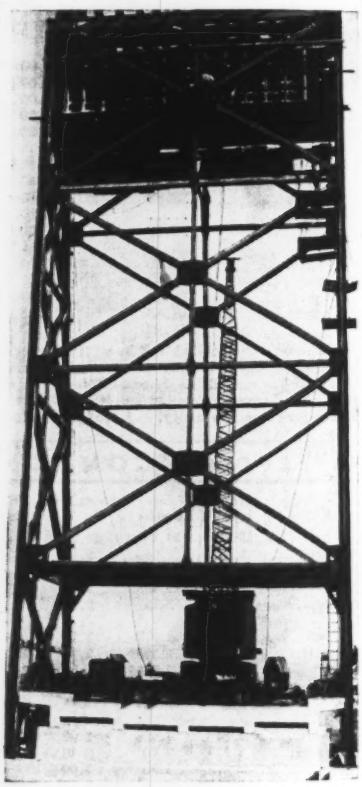


Fig. 3. All-welded steel tower assembled on concrete pier.

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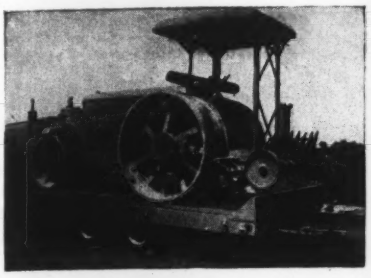
New Aids to the Constructor

MANUFACTURERS' LATEST DEVELOPMENTS IN EQUIPMENT AND MATERIALS

New Products Department, Engineering News-Record,

1

TRAILER—Tip-Top trailer is said to eliminate all need for skidding, blocking or winching and thus shorten time for loading heavy equipment. When loading, tail skid is lowered and loading platform is raised by hydraulically controlled, hand-operated pump. Equipment is driven on trailer under its own power, with tail skid serving as ramp. Release valve is then opened so that loading platform will return to original position and automatically lock. Tail



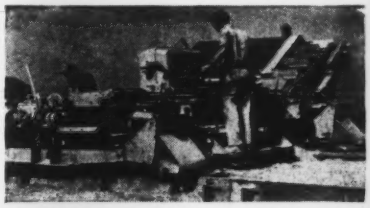
skid is then hydraulically raised to shorten overall vehicle length and to serve as barrier for load. Constructed with pressed steel frame, trailer is available in two standard models, 7-ton capacity (single axle) and 12-ton capacity (tandem axle).—*Arthur Rehberger & Son, Inc., Newark, N. J.*

2

LUBRICATING OIL—Combining advantages of full detergency and tough film qualities of paraffin base, Gulflube H. D. motor oil was developed for automotive diesel engines and gasoline engines operating in extra heavy-duty service. Patened anti-foram agent, prevents crankcase foaming under severest temperatures and speeds; low pour point assures minimum drag and frictional resistance in cold weather starting; and high viscosity index gives high-pressure gage readings while motor is idling—*Gulf Oil Corp., Gulf Bldg., Pittsburgh, Pa.*

3

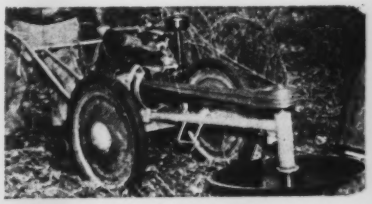
VIBRATORY SUBGRADER — New subgrader is reported to reduce power consumption and lower cost per square yard of preparing subgrade. Extensive trials reveal that vibrating cutting edge will penetrate hardest material without transmitting shock or movement into road forms. Unit will produce accurate grade, true to crown and cross section, and crown can be adjusted as paving conditions require without stopping subgrading operation. To give final shape to subgrade, machine has two-wheel strike-off, which is adjustable for crown and width and is equipped with control lever for raising or lowering blades. It is not concealed under subgrader but is towed behind at distance of 6 ft. Fines for filling any small hole or irregularity



and to complete final screeding-in operation are provided by small vertical openings in cutter assembly. Vibrations at 2,000 impulses per minute are produced by generators mounted on back of cutter assembly. Impact of vibrations flows in fore and aft direction directly into subgrade. — *Blaw-Knox Co., 2086 Farmers Bank Bldg., Pittsburgh 22, Pa.*

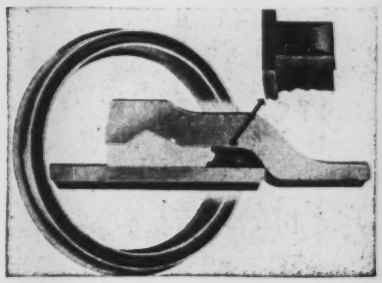
4

PORTABLE SAWS—Important design innovations on new model 100 engine-driven C-Saw are Rototrac self-propelling feature and automatic, mercury-type C-Saw clutch. Rototrac self-propelling is simplified friction drive that operates from engine shaft. Clutch is mercury filled fluid and centrifugal action type.—*Harry A. Lowther Co., 141 W. Jackson Blvd., Chicago 4, Ill.*



5

RUBBER SEAL—Self-adjusting, self-locking rubber ring packing for pouring wet or dry bell and spigot cast iron pipe joints can be used with any joint compound and installed quickly without cutting or fitting. It is hydrostatically designed to increase its sealing action automatically from pressure in line. Without compound, it will hold 40 to 60 lb. of pressure. Because ring is nonporous, it cannot be culture point for bacteria or other contaminating elements.—*Smith-Blair, Inc., South San Francisco, Calif.*



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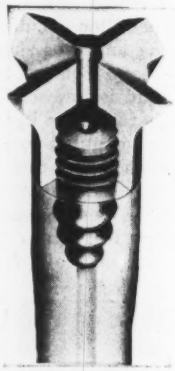
6

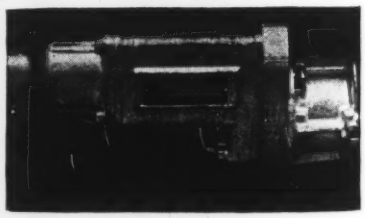
STUD-TYPE JACKBIT—New bit has carefully worked out wing curves that enable it to retain new bit proportions through many resharpenings. Resulting small gage loss permits use of successive bits with reductions in diameter of $\frac{1}{16}$ in. or less, which makes it possible to start holes with smaller bits



than those previously used and still bottom them at same size as before. Jackstud, which connects bit to drill rod, is made of high-grade, carburized alloy steel selected to withstand service. One end, cone-shaped and deeply furrowed, is driven while cold into heated end of drill rod. Driving operation can be readily performed with drill steel sharpener.—*Ingersoll-Rand Co., Phillipsburg, N. J.*

7

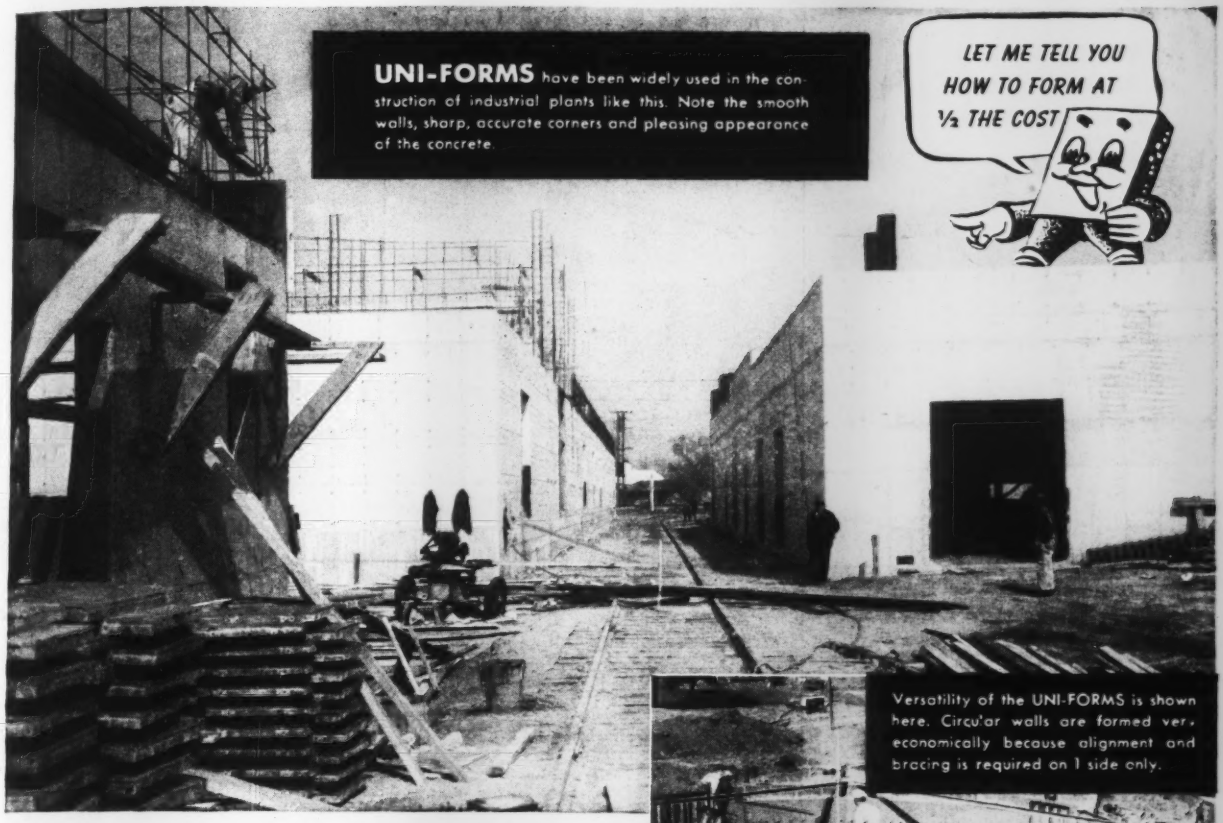
COMPRESSED AIR ENGINE STARTERS—New line of "Airstarters" will fit practically any make or model of multi-cylinder engine normally using electric starting and replace conventional electric starter motor without any modifications of engine.



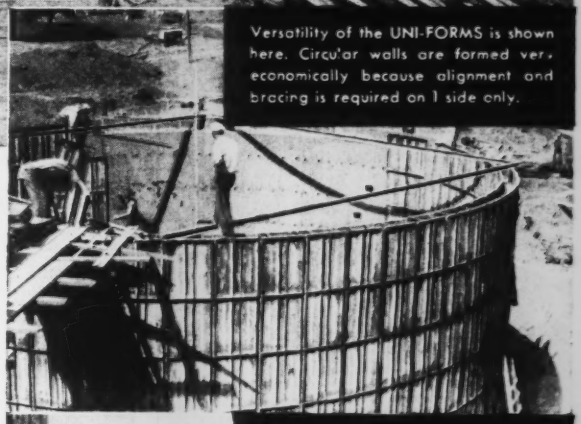
In addition to reduced fire hazard, they eliminate costly maintenance of storage batteries, provide reserve power and fast cranking speeds.—*Bethlehem Supply Co. of California, P. O. Box 3128 Terminal Annex, Los Angeles 54, Calif.*

8

RADIAL SAW—Raydol Woodworker features one-piece arm-column base; automatic position finders; perfect balance in all positions; frictionless carriage; completely inclosed motor; fewer parts; portability. Column-arm



UNI-FORMS have been widely used in the construction of industrial plants like this. Note the smooth walls, sharp, accurate corners and pleasing appearance of the concrete.



Versatility of the UNI-FORMS is shown here. Circular walls are formed very economically because alignment and bracing is required on 1 side only.

UNI-FORMS Handle *Every* Concrete Forming Job

UNI-FORMS can be used to form *any* type of concrete wall—circular, battered, or straight, with the same speed and economy that has made them the preferred prefabricated wall form.

They are faster to erect, easier to strip and require alignment on one side only—regardless of the type of wall being formed. UNI-FORMS are cutting forming time and costs *at least 50%*.

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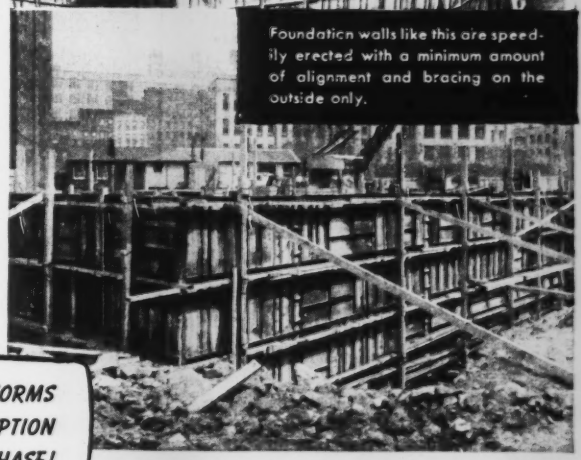

Foundation walls like this are speedily erected with a minimum amount of alignment and bracing on the outside only.

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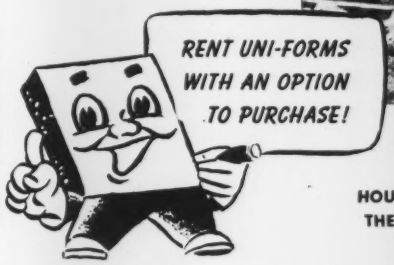

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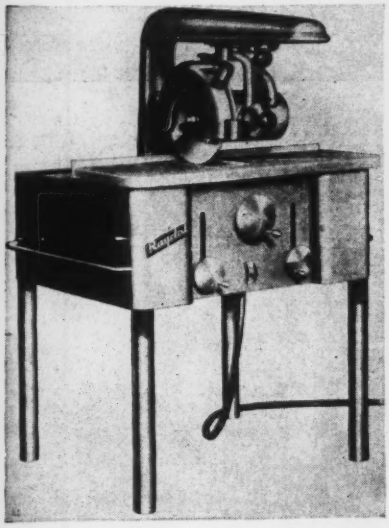
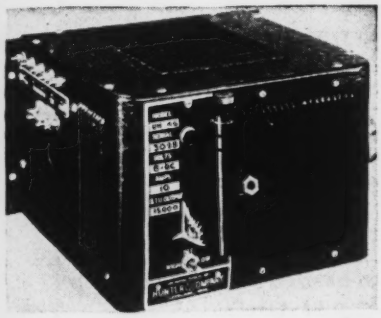
structure can be fed forward on base plate by control on front panel, allowing cutting tool to be moved up to



material, thus using full capacity without moving guide strip. Compact design of motor allows use of cutting tools to within 2½ in. of center of arbor.—*Cotton Engineering Corp., Bartlett, Ill.*

9

TRUCK CAB HEATER—Fully automatic gasoline-burning heater for heating and ventilation of truck cabs is 7 x 10 x 10 in. in size and operates independently of engine. It is spark ignited and thermostatically controlled.



Fresh air is supplied by air inlet tube that runs from heater to radiator grille. New heater can be equipped to operate when engine is not running. Some models are adapted to engine preheating.—*Hunter & Co., 1550 E. 17th St., Cleveland 14, Ohio.*

10

ROAD SLAB JOINT—New highway load transfer unit or road joint assembly is lightweight, rigid, easily installed dowel and supporting frame combination. Alternate dowels are welded to one side frame and one center wire, while remaining bars are welded to opposite frame and second center wire, so halves

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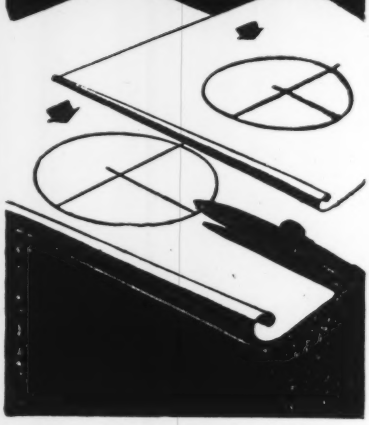

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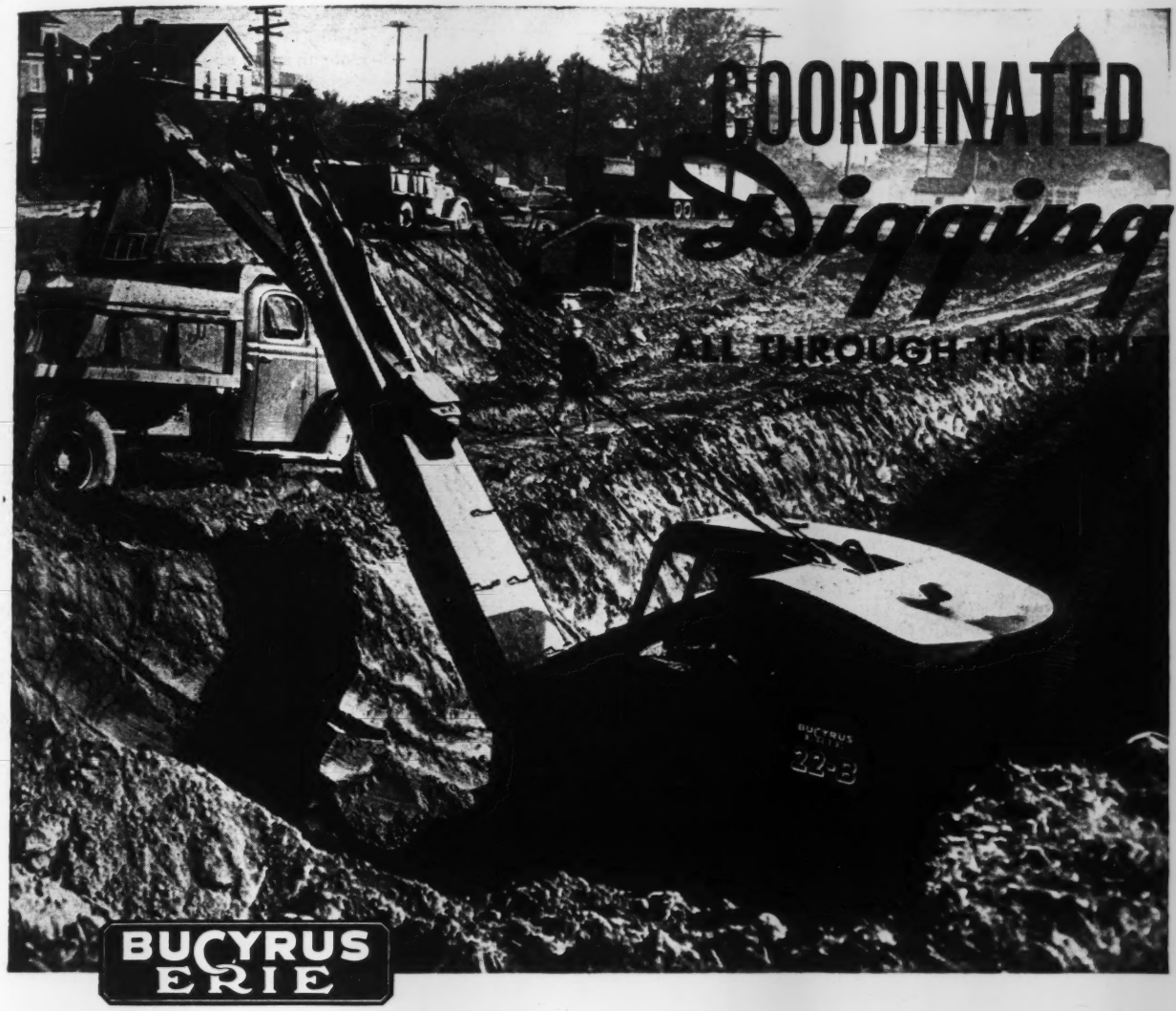

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102E47

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Ariz., Phoenix, Lee Redman Equipment Co.
Ark., Fort Smith, R. A. Young & Son
Little Rock, R. A. Young & Son

Calif., Richmond, Bay Equip. Co.
Cal., L. A. Golden State Equip. Co.
Colo., Denver, Power Equipment Co.
Conn., Wallingford, Wilhelm-Davies Co., Inc.

Fla., Gainesville, Constr. Equip. & Supply Co., Inc.
Miami, Allied Equip, Inc.
Orlando, Highway Equipment and Supply Co.
Tampa, Epperson & Company

Ga., Atlanta, Tractor & Machinery Company

Ida., Boise, Olson Manufacturing Co.
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Iowa, Cedar Rapids, McNall Mach. & Supply Corp.

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Ky., Harlan, Crounhorn Equip. & Supply Co
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Mich., Muskegon, Lakeshore Machy. & Supply Co.
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Miss., Jackson, Jackson Road Equip. Co.
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Md., Salisbury, Paving Supply & Equip. Co.
Mo., Clayton, The Howard Corporation
Mo., Kansas City, Machinery & Supplies Co., Inc.
Montana, Billings, Interstate Truck & Equip. Co.
Helena, Caird Eng. Works
Montana, Missoula, Miller Machinery Co.

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N. Hampshire, Manchester, R. C. Hazelton Co., Inc.
N. J., No. Bergen, American Air Comp. Corp
N. M., Albuquerque, Bud Fisher Co.
Roswell, Smith Machy. Co.
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New York, Hodge & Hammond, Inc.
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Dayton, Carroll-Edwards & Co.
Toledo, The Kilcorse Machy. Co.
Okla., Oklahoma City, Tattan-Douglas Equip. Co.
Oregon, Portland, Andrews Machinery

Pa., Wilkes-Barre, Ensminger & Co.
Mechanisburg, American Equip. Corp.
Philadelphia, Metalweld, Inc.

S. C., Columbia, Smith Equipment Co.

Tenn., Chattanooga, Dempster Bros., Inc.
Tenn., Knoxville, Dempster Bros., Inc.
Memphis, Hamilton Tractor Co.
Nashville, Dempster Bros., Inc.
Tex., Amarillo, T. W. Carpenter Equip. Co.
Abilene, W. T. McClure Mach. Co.
Dallas, Shaw Equip. Co.
Houston, So. Texas Equip. Co., Inc.
San Antonio, Patten Machy. Co.
Tyler, D. M. McClure Equip. Co.

Utah, Salt Lake City, J. K. Wheeler Mach. Co

Vt., Barre, A. M. Flanders, Inc.
Va., Richmond, Highway Machy. and Supply Co.

W. Va., South Charleston, Allied Equip. Co.
Wash., D. C., Paving Supply & Equip. Co.
Wash., Seattle Star Machy. Co.
Wisc., Milwaukee, Drott Tractor Co., Inc.

Ransome Distributors

La., New Orleans, Ole K. Olson Co.

N. Y., Rochester, B-G Equip. Co.
O., Cleveland, H. B. Fuller Equip. Co.
Pa., Pittsburgh, Arrow Supply Company.

Worthington Distributors

Ind., Indianapolis, Reid-Holcomb Company

La., New Orleans, Wm. F. Surgi Equip. Co.

Md., Baltimore, D. C. Elphinstone, Inc.

O., Cleveland, Gibson-Stewart Co.
O., Columbus, Gibson-Stewart Co.

Pa., Allentown, H. N. Crowder, Jr., Inc.
Pittsburgh, Atlas Equip. Corp.

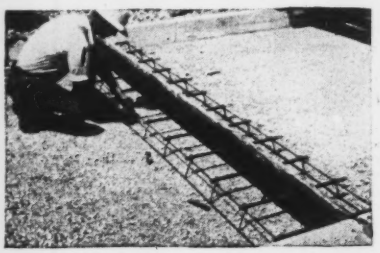
Texas, El Paso, Equip. Supply Co.

Wyoming, Cheyenne, Wilson Equip. & Supply Co.

BUY BLUE BRUTES

Worthington Pump and Machinery Corp
Worthington-Ransome Construction Equipment Division
Holyoke, Massachusetts

of assembly may be drawn apart for insertion of joint filler strip. Center wires hold filler vertical; side frames



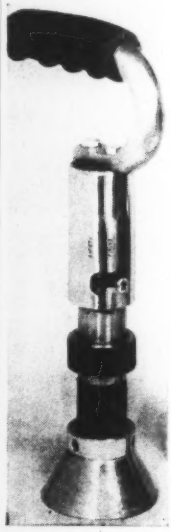
hold dowels securely at each end. Dowel bar unit for 12-ft. Pennsylvania road slab weighs only 84 lb. and is easily handled by two men.—*Bethlehem Steel Co., Inc., Bethlehem, Pa.*

11

BLOWPIPE—Designed for use with manufactured or natural gas, propane and compressed air on heating, annealing or soldering operations, new C-47 Weldimatic blowpipe, of special aluminum alloy, adds to original Weldit pipe advantages of light weight, increased capacity and improved balance as well as grip. This new blow pipe lowers air and gas expenses by automatically reducing flame to that of a small pilot light during inoperative moments.—Made by *Weldit, Inc.*, 990 *Oakman Blvd., Detroit 6, Michigan.*

12

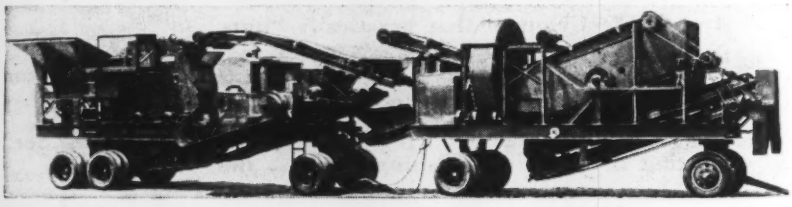
HAND TOOL—Utilizing explosive power principle of operation, Tempo-tool can speed and simplify installation operations in attaching steel to steel, concrete, brick, or mortar. Source of power is provided by exploding cartridge in inclosed chamber or breach. Explosion drives pin or stud through short barrel and into steel with such force that stud is firmly set in steel and will resist direct pull up to 20,000 lb. In addition to drive bins. Male and female threaded studs are available to accommodate nuts or threaded rods. Tool is available in two models: 22 for light fastening operations and 38 for heavier jobs.—*Tempo Products Co.*, 402 *Perry-Payne Bldg., Cleveland, Ohio.*



13

BEAM COMPASS—A completely new type of beam compass features unusual compactness and rapid, efficient radius setting. It applies the principle of the flexible-rigid type of steel tape retractable into a small, rugged die-cast. Instant radius settings up to 72 in. may be used while a brake lever firmly locks the tape in any desired adjustment. An accurately machined head holds a standard drafting pencil lead or a steel scriber.—*The Omicron Co., 552 W. Windsor Road, Glendale 4, Calif.*

14



CRUSHING AND SCREENING PLANT—New portable two-unit crushing and screening plant is one-man push-button controlled outfit and is adaptable to either gravel crushing or quarry operations. Diesel power plant operates 3030 double impeller breaker, while electric generator, driven from same diesel, supplies power to individual electric motors for driving feeder, conveyors, screen and elevating wheel on screening unit. It can produce one, two or three products. Crushing or breaking unit is compact semi or full trailer assembly 28 ft. long. Plant has capacity up to 200 tons per hour of crushed stone.—*New Holland Mfg. Co. Mountville, Pa.*

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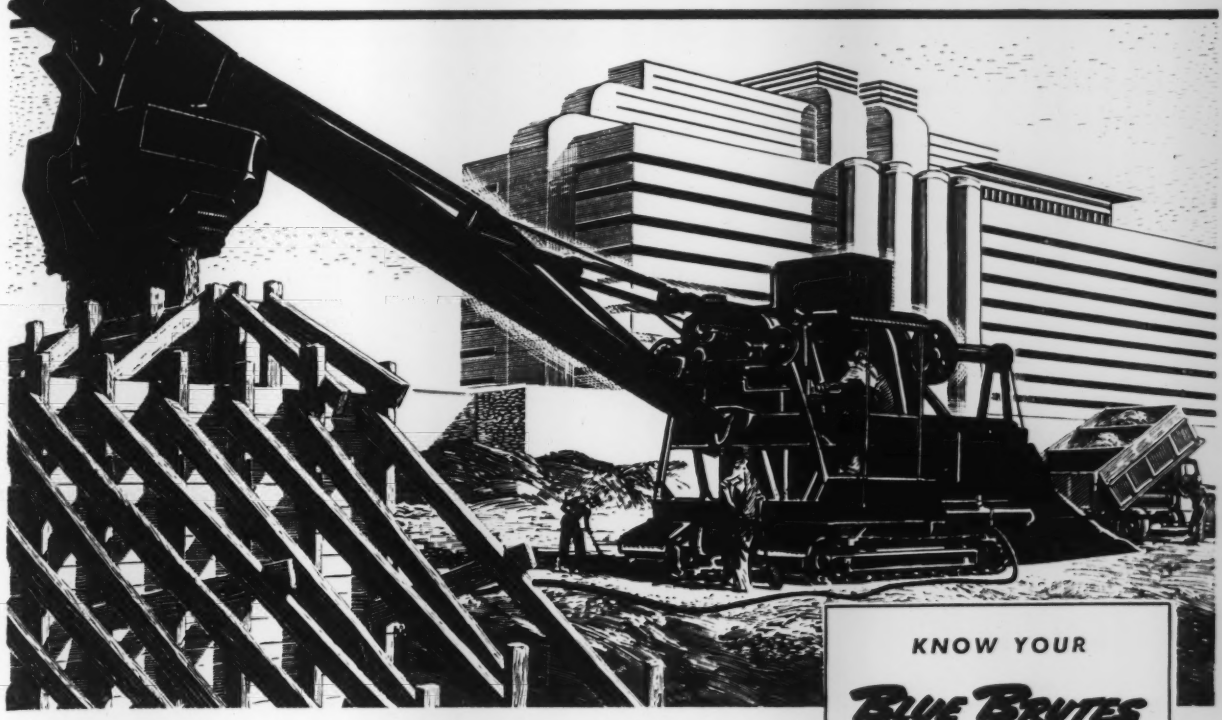

In the Ransome 34E Blue Brute Paver, with elevated boom attachment, you have a mobile, all-purpose mixing plant that can take a lot of *different,* off-highway jobs in its stride.

High foundation walls, isolated bridge piers and other hard-to-get-at spots are easily reached by the fast-swinging "live" boom that raises the discharge bucket to a 20-ft. clearance. And the positive hydraulic operation of both boom and bucket assures exact pouring-control, eliminating the need — and the risk — of a man to manually discharge the bucket at the top of a high form or batch hopper.

More Ransome Advantages

Features like these — automatic bucket-lock that prevents accidents when operating with elevated boom; unobstructed bucket opening that eliminates segregation; wide, long crawlers that go almost anywhere regardless of mud, sand or rough ground — all pile up proof that Ransome 34E Pavers, Single Drum or Dual Drum, can go farther, do more work faster, and cut costs every foot of the way.

Write for *all* the facts. Learn why *there's more worth in a Blue Brute.*

R7.6

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Your Blue Brute Distributor will be glad to show you how Worthington-Ransome construction equipment will put your jobs on a profitable basis. His name is listed on Page 128.

RANSOME EQUIPMENT

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WORTHINGTON EQUIPMENT

Gasoline and Diesel Driven Portable Compressors, Rock Drills, Air Tools, Self-Priming Centrifugal Pumps and Accessories.

WORTHINGTON

Worthington Pump and Machinery Corporation, Worthington-Ransome Construction Equipment Division, Holyoke, Mass.

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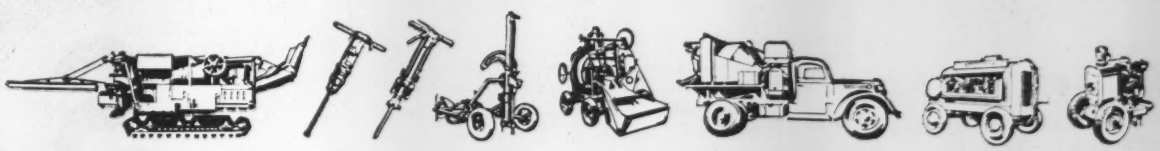

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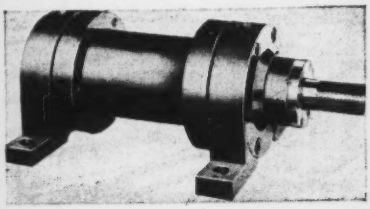
15

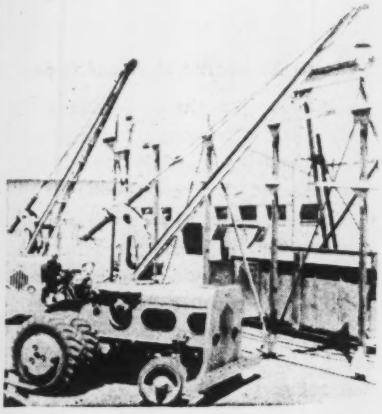
OIL HYDRAULIC CYLINDERS—Cylinder heads flame cut and machined from steel mill plate are incorporated in new line of hydraulic cylinders. Ports can be easily and quickly repositioned to suit particular application.



Caps, flanges, cylinder tubes, piston rods, and C-rings of all steel construction reduce breakage. Pistons are aluminum alloy. Cylinder is designed to operate at 1,500 psi. working pressure.—*Lindberg Engineering Co.*, 2444 *W. Hubbard St., Chicago* 12, *Ill.*

16

CRANE—Type U crane has lifting capacity of from 1½ to 4 tons. Inclosed stabilizers permit full front axle movement for smoother traveling, but provide positive support when swinging load. All-welded steel boom



is raised and lowered by hydraulic cylinder mounted on gantry. Rig is mounted on Model UTI Minneapolis Moline tractor, which has rear power takeoff and pintle hook drawbar at rear, so it can be used for other purposes when crane work is slack.—*Joshua Hendy Corp., Torrance, Calif.*

17

VIBRATING SCREEN—New "CA" Concentric-Action Screen is inclined floor-mounted or spring-and-cable suspended screen with ingeniously balanced two-bearing vibrator mechanism which imparts concentric or circular vibrating motion to all points of screening surfaces. It can be used for both

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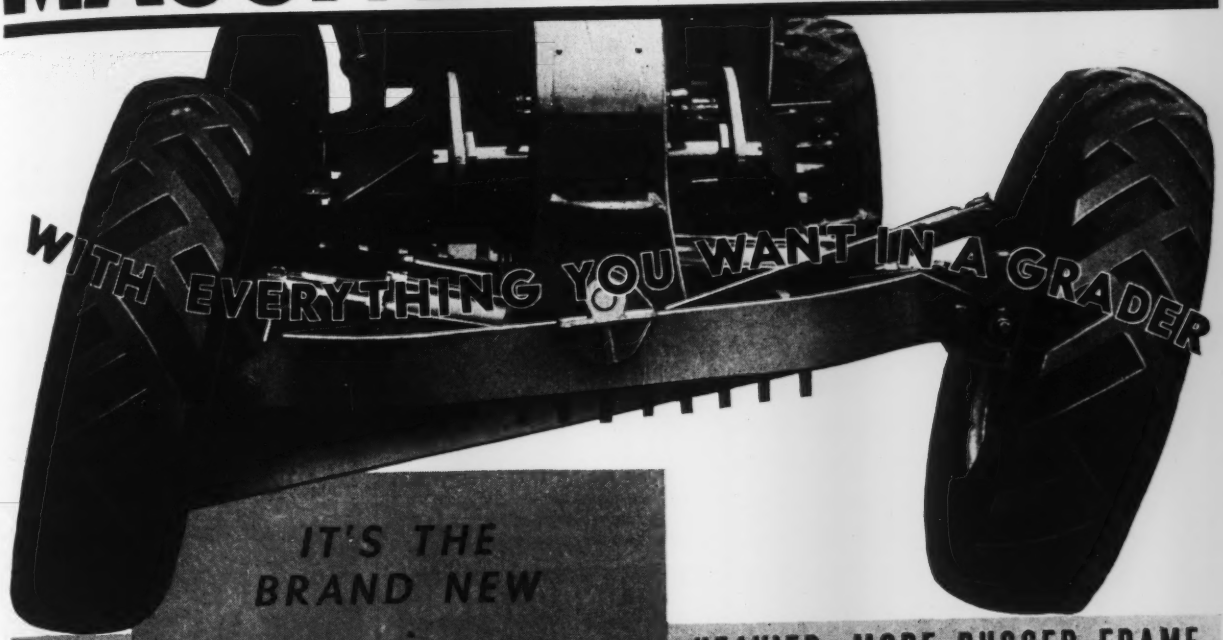

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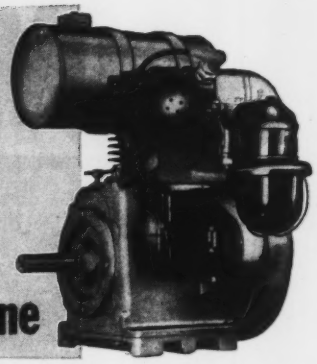

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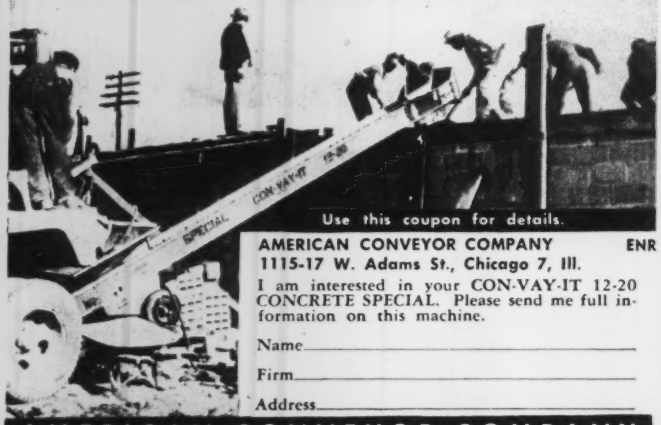

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medium and heavy duty sizing as well as for scalping and dewatering or rinsing operations. It is made with double or triple decks and in sizes ranging from 3x8 ft. to 6x14 ft. Single-deck screens can be provided by merely removing lower deck of standard double-deck screen.—*Link-Belt Co., 307 N. Michigan Ave., Chicago 1, Ill.*

17-A

JAW CRUSHER—Said to be world's largest overhead eccentric jaw crusher, new unit has hard rock capacity of 210 tons per hour at 3-in. discharge opening. Movable jaw is 10 ft., 10 in. high and weighs 35,000 lb. Range of discharge opening is 2 to 8 in.—*Lippman Eng'ring Works, Milwaukee, Wis.*

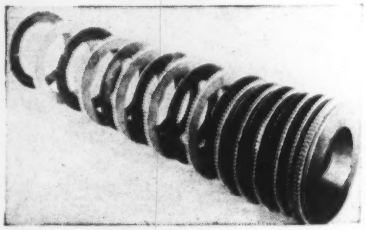
18

SPREADER BOX — This all-welded box can be bolted on dump truck body, replacing the tail gate. Weight is 105 lb., for box that fits 6-ft. wide dump truck body. Half circle opening can

be regulated to any desired aperture up to 6 in. Material pours through this opening evenly, aided by force of gravity.—*Yaun Welding Boiler & Machine Works, 2100 N. Third St., Baton Rouge, La.*

19

STEERING CLUTCH PACKS—Seven new clutch facing and brake lining assemblies have been announced by this company. Included are steering clutch packs for D2, D4, D6, D7, and D8



tractors, clutch disks and brake band linings for No. 24 and No. 25 cable controls, and master clutch plates for No. 11 and No. 12 motor graders.—*S. K. Wellman Co., 1374 E. 51st St., Cleveland, Ohio.*

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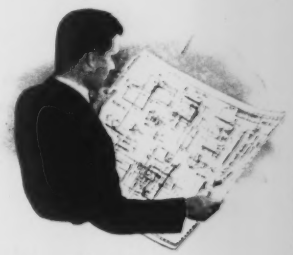

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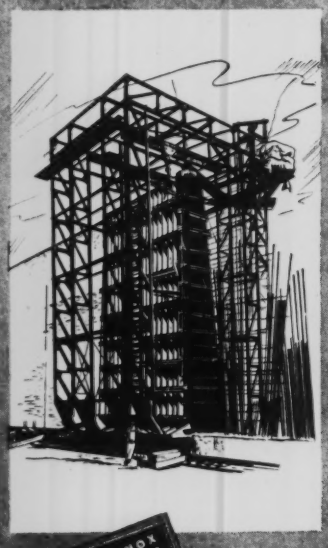

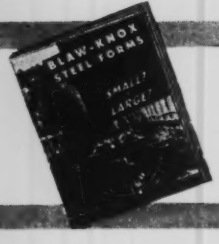

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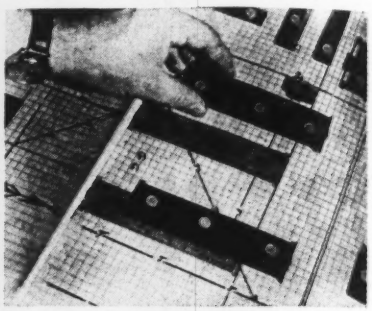
20

MACHINERY TEMPLETS — Magne-Plastic templets provide permanent facsimiles, scaled to size, of machines and equipment, for use in plant layout. Made from sheets of clear, shatter-resistant Plexiglas, coated on one side with photographic emulsion, they are used in conjunction with thin, trans-



parent plastic layout mat, on which outline of building or plant area can be drawn. Scaled drawings of machines are reproduced as negatives on exposed and developed emulsion and cut to exact shape from Plexiglas sheet.—Plexiglas is made by *Rohm & Haas Co., Washington Square, Philadelphia, Pa.*, and templets produced by *John Hill Layouts, 145 Robertson St., Mt. Clemens, Mich.*

21

POWER BUGGY—Sturdy motorized wheelbarrow and dump truck enables one man to do work of six with wheelbarrows in hauling wet concrete, dirt, bricks, castings, tools, or refuse. Power Buggy hauls 2,000 lb. or 12 cu. ft. at speeds from 2 to 15 mph., forward or

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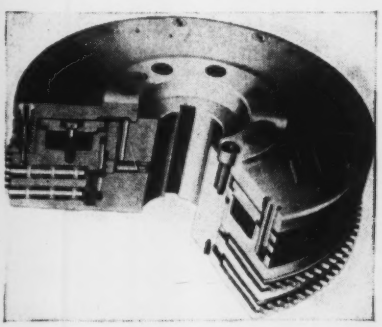
22

EARTH DRILL—Hydraulically controlled Model HJB earth boring machine drills 6 to 42-in. dia. holes to depths of 10 ft. Steady hydraulic power moves tower into instant operating position. Other fingertip controls quickly permit adjustment of drill head to vertical position. All leveling adjustments for straight or anchor holes are completely hydraulic. It is powered by slow-speed 4-cylinder Buda gasoline engine.—*Buda Co., Harvey, Ill.*

24

AIR-ACTUATED CLUTCH—Model PH Clutch, available in 30, 36 and 42-in. sizes, supplements regular line of Model P air-actuated clutches and widens range for selection of unit to fit any need. Sizes of two models now run from 14 to 42 in. with capacities from 75 hp. to 1,325 hp. Torque ratings range from 900 to 89,500 ft.-lb. —*Twin Disc Clutch Co., Racine, Wis.*



25

RAYON CONVEYOR BELT—Conveyor belt with rayon cord plies is designed to meet need for belt of higher tensile strength to increase heavy-duty, long-lift conditions.—*Raybestos-Manhattan, Inc., Passaic, N. J.*

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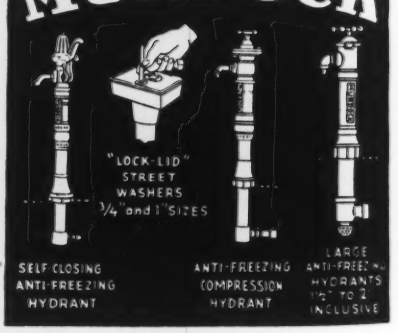
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BECAUSE IT MAY HELP YOU TO PREVENT THEM!

It may sound like a miracle . . . *but fire-retardant wood is here!*

Koppers fire-retardant wood demonstrates its effectiveness in the tests pictured . . . and has several times confirmed it in fires in plants and factories built of the material. These fires were speedily brought under control, with only minor structural damage, *because of the protection given by Koppers fire-retardant treatment.*

Engineers have been quick to recognize the service and economic advantages of Koppers fire-retardant wood, and have applied it in floors, roofing, sheathing and structural members of industrial buildings, garages, airplane hangars, munitions plants, docks and warehouse buildings, railroad engine houses, and other similar structures. Koppers CZC(FR) treatment has a valuable *plus* advantage, *for it also fortifies the wood against decay and termite attack.* Color and paintability are not harmed by the odorless CZC(FR) treatment.

The nation's fire losses in the average year total almost half a billion dollars. Losses can be saved, building contents protected, and fire-control efforts aided, through the use of Koppers fire-retardant wood. In its broader utility and multiplied benefits, Koppers fire-retardant wood is practically a *new* structural material. It opens new fields and opportunities for the world's oldest, most versatile, most easily worked, and most desirable structural material.

"Koppers Fire-Retardant Wood" just off the press. Filled with interesting, helpful information. Ask for a copy.

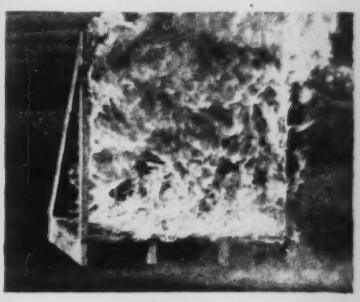
K KOPPERS

PRESSURE-TREATED WOOD

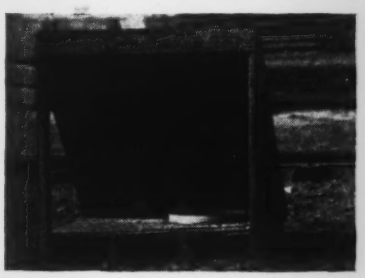
KOPPERS COMPANY, INC.

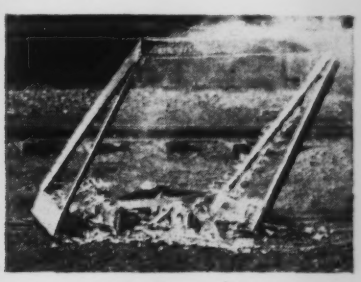
PITTSBURGH 19, PENNSYLVANIA

Test structures built of Koppers fire-retardant wood (left) and untreated wood (right) ready for the fire test. Five quarts of kerosene, placed in pans, furnishes fuel for each blaze.



Both structures are quickly enveloped in flame. Treated structure resists fire, but untreated one encourages it, contributes fuel to the fire.





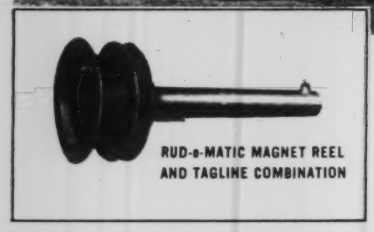
After twenty-two minutes the untreated structure, still burning, is collapsing. Note that in the treated structure, the fire stopped when the fuel burned out.

(Above) Continued burning reduced the untreated structure to ashes.

(Left) The treated structure was charred . . . but retained its integrity and strength, as the 800 pound load shows.

RUD-O-MATIC

TAGLINES



RUD-o-MATIC MAGNET REEL AND TAGLINE COMBINATION

INCREASE MAGNET CABLE LIFE

The electric cable cannot jerk or pull loose from its terminals—tangle or snag. Spring tension steadies the magnet. Both cables feed together with tension on the tagline cable and slack on the electric cable. Used as standard equipment by most crane manufacturers—available in 5 models to fit your needs.

**DEALERS—a few selected territories in the midwest and northwest are still open. Write for all details.*

Provides positive, steady tension—holds buckets steady under all working conditions

A silent, efficient, and dependable worker on all jobs—RUD-o-MATIC Taglines are used as standard equipment by most crane manufacturers. The spring tension is powerful enough to hold a clam shell bucket steady under the roughest and toughest of conditions. Operates perfectly with boom at any angle. Compact—it can be installed in less than thirty minutes. There is none of the trouble found with the average tagline for there are no pins, weights, tracks, or carriages to wear or be replaced, and fewer sheaves make for a definite saving in cable wear. The RUD-o-MATIC Tagline is available in eight models, each designed and built with the desired tension for various bucket sizes. Taglines are complete with fairlead U bolt clamping plates, and cable attached. Immediate delivery—see your equipment dealer—or write—

McCAFFREY-RUDDOCK *Tagline* CORP.

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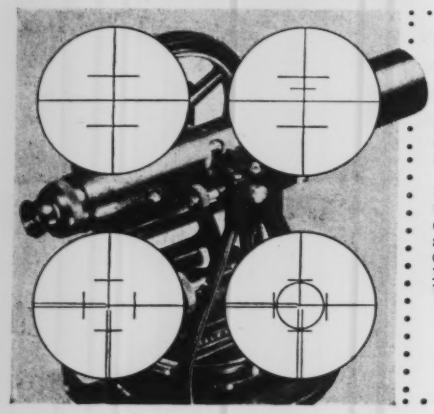

Here's why Gurley Instruments now feature quick-reading glass reticles...exclusively

Study these *new* reticle patterns. Think of them in your Gurley transit. They'll make your surveying job easier.

Here's the latest advance in engineering instruments—glass reticles in patterns to suit all surveying needs—developed by Gurley for added efficiency and accuracy, and incorporated in all new Gurley instruments. Write today for Bulletin No. 50. W. & L. E. Gurley, Union Plaza, Troy, N. Y.

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Scientific and Surveying Instrument Makers Since 1845

Manufacturers' Publications

26

Liquid and Gas Flow Measurement—(32-p. bulletin) Describes advantages of Flowrator meter, covering basic principles, flexibility, accuracy, linear flow characteristics, wide flow range, and immunity of calibration to variations in fluid viscosity.—*Dept. 4X-F, Fischer & Porter Co., Hatboro, Pa.*

27

Batching Plants—(16-p. catalog) Describes line of portable batching plants and equipment for aggregates and cement. Also explained and illustrated are new twin weighing batchers for one-stop batching of aggregates and cement into two-batch trucks and new portable bulk cement plant with combination arrangement of bins. —*Blaw-Knox Co., Pittsburgh 22, Pa.*

Men and Jobs

Charles H. Wagner has been appointed project engineer on the Harlan County Dam, near Alma, Neb., on the Republican River.

Mr. Wagner was separated from the armed forces as a captain, after serving almost 4 years as a construction and post engineer in Canada. He has been associated with the construction of dams since 1926, having been in charge of construction of locks and dams in the upper Ohio system of flood control. His most recent assignment was that of chief of construction in the Nashville District, where he was in charge of the construction of Wolf Creek and Dale Hollow dams.

H. Irving Skilton has been appointed city engineer of Hartford, Conn. He was promoted from division engineer to assistant city engineer in No-

(*Continued on page* 142)

. . . with INTERNATIONAL DIESELS

You'll find International Diesel Crawlers hard to beat for excavating, loading and general utility work. When equipped with tractor shovels that are also 'dozers, International Diesels work and save in many ways. They can cut your costs to rock bottom with their low-cost operation and top-notch efficiency.

Use these units to dig basements and other excavations, to dig out and load sand and gravel—or snow—on trucks or wagons. Use them also as bulldozers in backfilling and many other jobs.

When crawlers offer the versatility, operating economy and dependability of International Diesels, it is good business to standardize on them. Ask your International Industrial Power Distributor to assist you in selecting the tractors and equipment you need.

Industrial Power Division

INTERNATIONAL HARVESTER COMPANY

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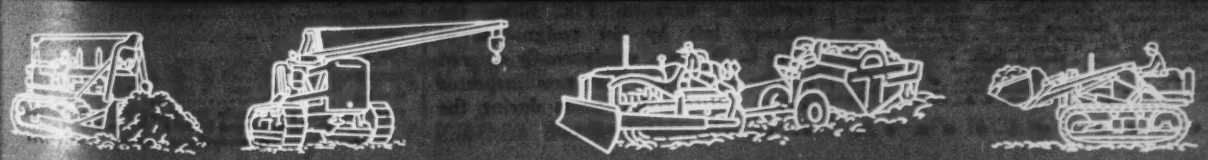
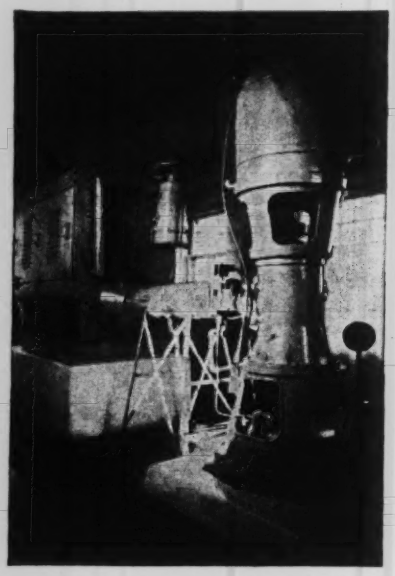
INTERNATIONAL HARVESTER

Industrial Power



IN CASE OF *Power* FAILURE



The city of Margate, New Jersey no longer worries about an unforeseen powerline failure. Their newly installed million gallon per day Layne Well Water System is DUAL POWERED. Should the power fail and the electric motor "go dead" a big husky gasoline engine takes over to keep up water production.

Margate's new dual powered water system is a quality installation throughout with the very latest Layne developed control and engineering features. And like two other Layne installations for Margate—one of which is over 23 years old, this new unit will also give years and years of satisfactory operation.

Layne Well Water Systems whether installed for cities, factories, railroads, irrigation projects or other use, keep water production at the very lowest cost. Furthermore Layne associated companies constantly provide prompt repair and parts service for their Layne installation. For late catalogs, address Layne & Bowler, Inc., General Offices, Memphis 8, Tennessee.

LAYNE WELL WATER Systems

AFFILIATED COMPANIES: Layne-Arkansas Co., Stuttgart, Ark. * Layne-Atlantic Co., Norfolk, Va. * Layne-Central Co., Memphis, Tenn. * Layne-Northern Co., Mishawaka, Ind. * Layne-Louisiana Co., Lake Charles, La., * Louisiana Well Co., Monroe, La. * Layne-New York Co., New York City * Layne-Northwest Co., Milwaukee, Wis. * Layne-Ohio Co., Columbus, Ohio * Layne-Pacific, Inc., Seattle, Wash. * Layne-Texas Co., Houston, Texas * Layne-Western Co., Kansas City, Mo. * Layne-Minnesota Co., Minneapolis, Minn. * International Water Supply Ltd., London, Ont., Can. * Layne-Hispano Americana, S. A., Mexico, D. F.

(*Continued from page* 138)

vember, succeeding William A. D. Wurts, who was made manager of the Hartford metropolitan district. Mr. Skilton joined the engineering department in 1909. Robert J. Ross, who entered the department in 1907, city engineer is retiring to be consulting engineer for the Bureau of Public Works of the Metropolitan district and also to engage in private practice.

Resignation of **James S. Benson** as general manager of the Chicago Construction Equipment Co., Riverdale, Ill., has been announced. Mr. Benson, who served with the Army Engineers in the Pacific Theater, has been recalled by the Army with a commission of major. He has been assigned to Phillippine construction.

William T. St. Clair, formerly assistant to the president of Poe Hardware Co., Greenville, S. C., has joined J. E. Sirrine Co., as building design engineer. He is a graduate of Virginia Polytechnic Institute in civil engineering, 1925, and served with the Corps of Engineers as a lieutenant colonel during the war in the construction of Oak Ridge. Formerly he had his own industrial engineering firm in Nashville, Tenn.

Ray H. Bower, former chief engineer of Indiana, has been appointed managing engineer of Tipton, Inc., to succeed **W. N. Yoder.** He is a civil engineer graduate of Purdue University.

Gwynne D. LeGro has been appointed Wahkiakum County road engineer at Cathlamet, Wash., to succeed **C. L. Plymale,** who resigned to accept a position with the state highway department.

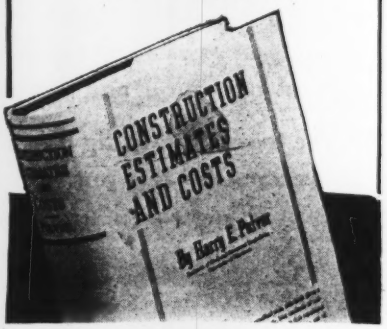
Frank J. Miller has been appointed city engineer and Fred C. Waidner street commissioner at Mishawaka, Ind.

George Beltemacchi has been named city engineer and **Joseph Hubertz** street commissioner of Logansport, Ind. Mr. Beltemacchi during the war was in government service and supervised the construction of two complete cities, one the Japanese concentration city at Cody, Wyo., and the other at the Army Flying Field, Kearney, Neb.

H. L. Baughman, former contractor and officer in the U. S. Army Engineers, has been appointed city building inspector of Sarasota, Fla., filling the vacancy left by the resignation of **John L. McLean,** who recently entered private business. The new inspector served with the Engineers during the war as a lieutenant colonel.

How to estimate construction costs
—quickly!
—accurately!

Revised 2nd Edition
Just Published



Meets all estimating problems with complete data and modern methods. A valuable tool for the contractor, architect and engineer.

CONSTRUCTION ESTIMATES and COSTS

By H. E. PULVER

Civil and Structural Engineer

653 *pages, scores of tables and diagrams,* $6.00

Thorough, systematic presentation

The book gives step-by-step instructions for estimating construction work of all kinds, including excavations, all parts of buildings, concrete, structural steel, and material transportation, profit, overhead, etc. These, combined with useful tables, diagrams and illustrative estimates, make this a complete manual of estimating for the contractor and engineer.

All these practical helps

Estimating by simple arithmetical methods—covers all steps; investigation, approximate estimate, complete detailed estimate—includes such elements as plumbing, waterproofing, electrical, heating and air conditioning—many illustrative, worked-out estimates of typical jobs—now fully revised in line with upward trend of wages and prices—a working guide for the beginner—a key to safer bids, better profits for all estimators.

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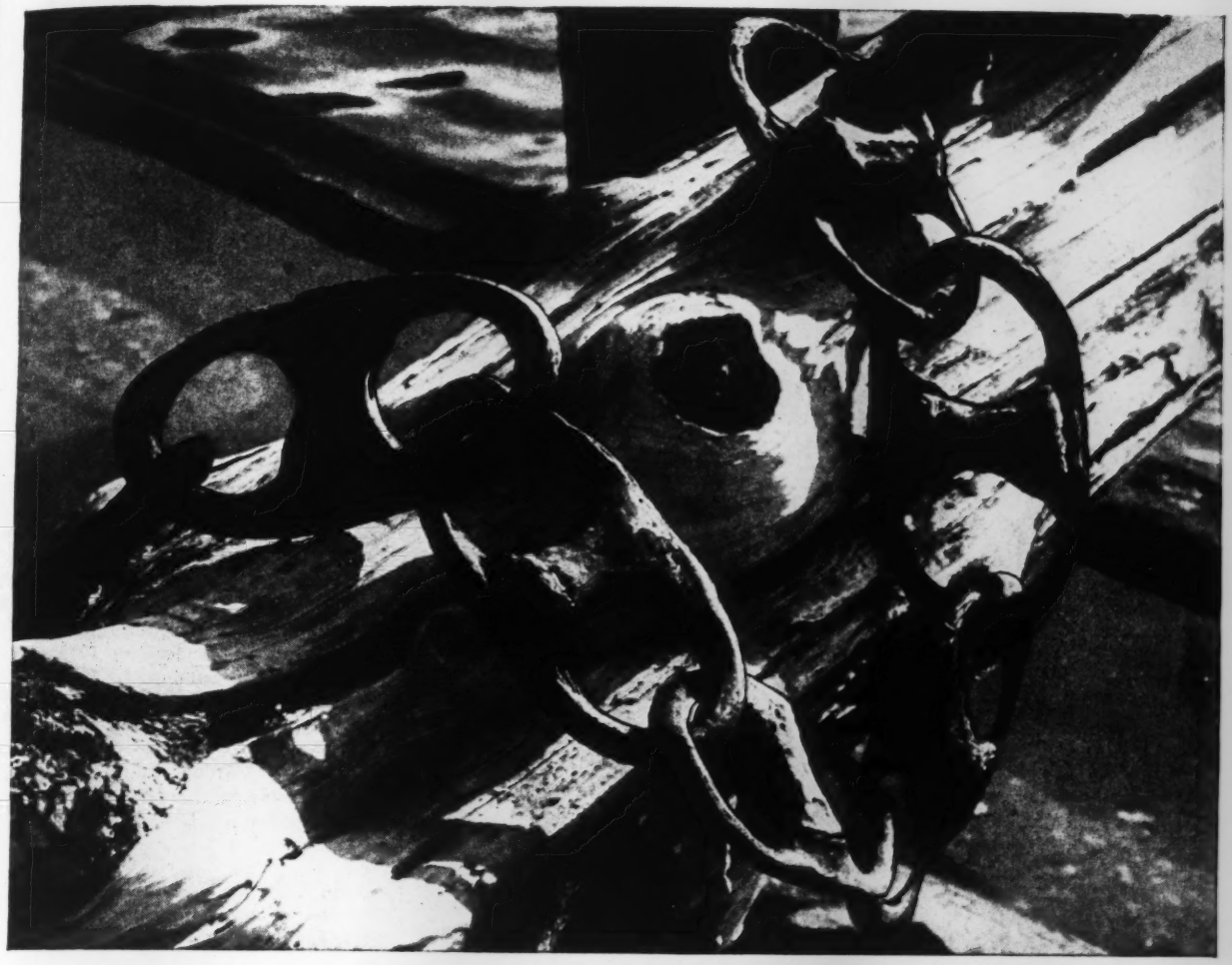


CHAIN REACTION

VERY OFTEN a single industrial lubrication problem in your plant, if allowed to run unchecked, can set off a whole chain of costly production hold-ups.

Rust or corrosion, for example, frequently unnoticed in its insidious early stages, may soon affect a vital piece of equipment or machine. Then, suddenly, an entire production line is thrown out of balance.

Furnishing expert counsel and advice on rust and corrosion problems is only one of the many ways Cities Service lubrication engineers can help you. These cost-conscious, production-minded experts are "professional worriers." Their recommendations for exactly the right grade of oils, greases, solvents or other petroleum products to meet your individual needs are based upon a sound, intelligent "situation analysis" made on the spot and backed by experience.

Moreover, behind the recommendations of a Cities Service lubrication engineer is the solid background of a company whose roots go back almost to the beginnings of the petroleum industry.

CITIES SERVICE

Why not let a Cities Service lubrication engineer do your "worrying" on all your industrial lubrication problems. Phone, wire or write Cities Service, Sixty Wall Tower, New York 5, N.Y. Room 3.

CITIES SERVICE *Means GREAT Service*

ALL THE WAY FROM THE REFINERY TO YOUR PLANT

Briggs & Stratton engines have no equal in value and performance . . . because they incorporate the engineering, technical and manufacturing *experience* gained in building more than 3¼ *million* air-cooled engines in the past 28 years of *continuous production.*

This unmatched experience is the reason why more and more Briggs & Stratton 4-cycle air-cooled engines are "Preferred Power" for an ever-increasing range of applications in every field requiring dependable gasoline power.

BRIGGS & STRATTON CORPORATION, MILWAUKEE 1, WIS., U. S. A.

Elections and Activities

Steve Barnes, Los Angeles, Calif., has been elected president of the Structural Engineers Association of Southern California, succeeding Richard W. Ware, Pasadena.

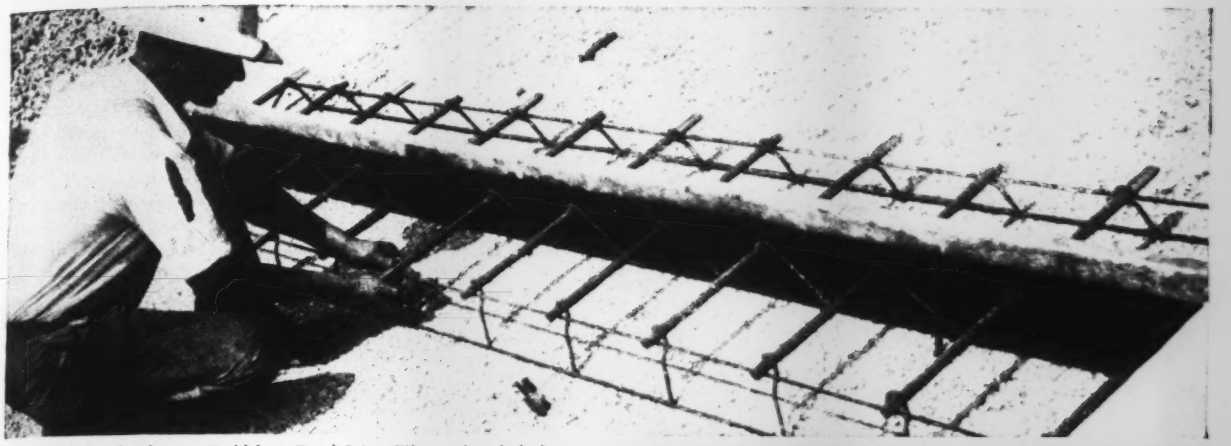
Steve Barnes

Harry W. Bolin, principal structural engineer of the state division of architecture, was named vice-president, and Lewis K. Osborn, designing structural engineer of Kistner, Curtis and Wright, secretary-treasurer. Members of the board of directors for 1948 are Ware, George E. Bandow, L. T. Evans, Harold P. King and Donald F. Shugart, all practicing engineers in southern California. The new president, a graduate of Purdue University, has practiced structural engineering from his own office in Los Angeles since 1934.

John A. Blume, consulting structural engineer, San Francisco, has been elected president of the Structural Engineers Association of Northern California. Jesse Rosenwald, also a San Francisco structural engineer, was chosen vice president, and A. W. Anderson, Oakland structural engineer; Henry J. Degenkolb, structural engineer with J. J Gould, San Francisco, and John E. Rinne, structural engineer with Standard Oil of California, were named new directors. Hold over directors are William W. Moore, retiring president, of Dames & Moore. Foundation Engineers, and Robert D. Dewell, consulting engineer, both of San Francisco.

J. A. Blume

A graduate of Stanford University, Blume worked as construction engineer for California on the San Francisco-Oakland Bay Bridge and later as structural designer and field engineer for Standard of California. He later spent several years with H. J. Brunnier, structural engineer, as engineer in charge on a number of large projects, including Army and Navy depots.



Installing dowel tubes on Bethlehem Road Joint. These tubes, locked into place on free ends of dowels, provide positive clearance for dowel movement when expansion of the concrete takes place.

New Road Joint

HELPS SOLVE LOAD-TRANSFER PROBLEMS

Here it is—the new time-saving Bethlehem Road Joint —a lightweight bar-dowel unit that is specially designed to reduce to a minimum the load-transfer problems caused by heavy wheel loads.

Consisting of two identical units, each with sheared dowels rigidly welded to the side frame and center wire, the Bethlehem Road Joint combats load-transfer difficulties by holding the dowels in accurate alignment in both horizontal and vertical planes, at the same time permitting free movement of dowels in the concrete.

The Bethlehem Road Joint saves time for highway contractors, too, because it comes completely fabricated. Moreover, it is light enough to be handled by two men.

The joint nests conveniently, making it economical to ship by rail or truck. It lends itself to the various designs and specifications of state highway departments, and can be used either plain or with practically any type of expansion or contraction material.

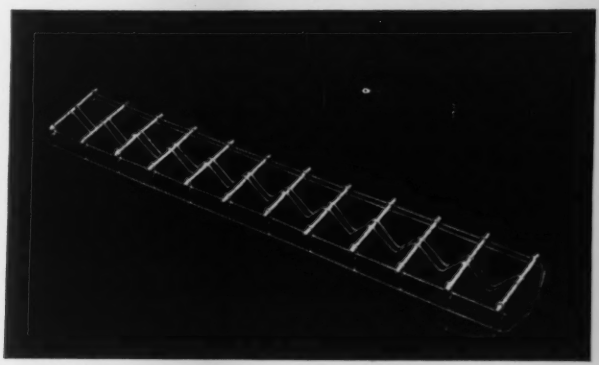
For complete information about the new Bethlehem Road Joint and its applications in highways or airport runways, get in touch with the nearest Bethlehem district office. Or write us at Bethlehem, Pa.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

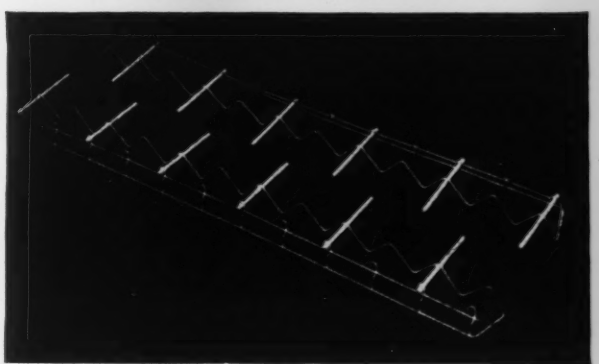
On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

STEEL FOR HIGHWAYS

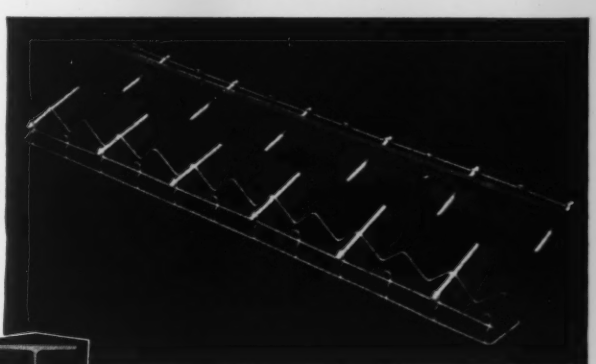
Reinforcing Bars · **Bar Mats** · **Guard Rail** · **Road Joints**
Tie Rods · **Guard Rail Posts and Brackets**
Wire Rope and Strand · **Spikes** · **Hollow Drill Steel**
Fabricated Structural Steel · **Bolts and Nuts**
Sheet and H-Piling · **Timber Bridge Hardware**



Bethlehem Road Joint comes completely assembled, ready for installation. Note how ends of dowels occupy loops in side frames.



If desired, joint can be quickly separated into these two identical sections to accommodate expansion or contraction material.



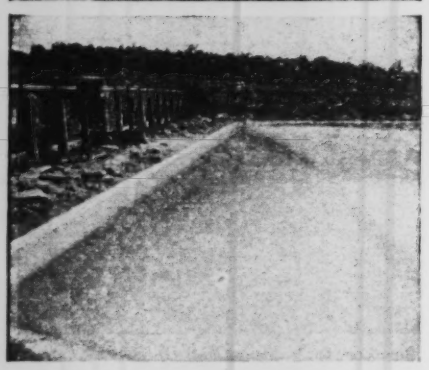
BETHLEHEM STEEL

Here joint filler, mounted on dowels, is pushed back to center wire. Unit is now ready for reassembly.

CEMENT GUN COMPANY

"GUNITE" CONTRACTORS

GENERAL OFFICES—ALLENTOWN, PENNA., U.S.A.



NO MAINTENANCE IN 22 YEARS

The before and after photos show a reservoir we re-lined with "GUNITE" in 1925 for the Village of East Aurora, N. Y. Recently Mr. V. E. Haemmerlein, Village Engineer, wrote us:

"The job you did of Guniting our reservoir is still in first class condition. Some hair cracks have developed near the top. I drilled one-half inch holes where some of these cracks showed but find that they are only about one inch deep. They do not go beyond reinforcing. We have had no maintenance whatsoever.

We can similarly solve your problem if you have an old leaky or disintegrated reservoir. We invite you to call on us for complete information, recommendations or estimates on any "GUNITE" work which you may be planning.

Our 72-page bulletin A2300 describes this job and scores of other profitable uses of "GUNITE." Write for your free copy today.

For over 43 years the Earle Gear and Machine Co. has been designing and building operating machinery for bridges, dams, locks, gates and dredges for hundreds of installations throughout this country and abroad.

Why not take advantage of this "know how"—get the benefit of experience.

Earle Gear engineers will gladly work with you to help solve your gear or machinery problems. Earle Gear equipment will assure you positive, trouble-free operation with a minimum of maintenance and repair.

Enlist the aid of our specialists by getting in touch with us, now—or, if you want further information first, write for our new catalog on Earle operating machinery.

The EARLE GEAR AND MACHINE COMPANY, 4717 Stenton Avenue, Philadelphia 44, Pa. Sales Offices: 149 Broadway, New York 6 • 901 Davis Avenue, Pittsburgh 12, Pa.

EARLE OPERATING MACHINERY EARLE GEARS

Officers of the Highway Research Board have been elected as follows: F. V. Reagel, engineer of materials, Missouri State Highway Department, was elected chairman of the board succeeding Roger L. Morrison. New vice-chairman is R. A. Moyer, research associate professor of highway engineering, Iowa State College. Reagel, Moyer and Pyke Johnson, president of the Automotive Safety Foundation were returned membership on the board's executive committee.

Lee H. Johnson, of Oxford, Miss., dean of the University of Mississippi School of Engineering, has been elected president of the Mid-South Section of the American Society of Civil Engineers. He succeeds Garner W. Miller, of Memphis, Tenn. Other officers elected were Gene Bespalow, Memphis, Tenn., vice-president, and H. G. Dewey, Clinton, Miss., secretary-treasurer.

W. A. Glass, of Miami, has been elected chairman of the Florida and Cuban sections of the American Waterworks Association.

Other officers elected were W. W. Gillespie, Jacksonville, vice-chairman; Dr. A. P. Black, Gainesville, secretary-treasurer. Trustees elected are M. R. Boyce, Clearwater; W. H. Young, Ormond Beach and R. J. Anninn, Orlando.

The Engineers Club of Washington, D. C. has been organized and at the recent election of officers Fred A. Leser, Washington representative of the Ilg Electric Ventilating Co., was chosen the group's first president. E. L. Chandler, eastern representative of the ASCE, has been named vice-president, and S. L. Gregg of the Navy Department, treasurer.

Civil engineers and construction engineers named to the board of directors include: C. A. Betts of the U. S. Forest Service; Col. Byron Bird of the Washington, D. C. district office of the Corps of Engineers; B. F. Locraft, consulting engineer; T. R. Tate of the Chas. T. Main Co., and A. N. Carter, regional editor of *Engineering News-Record* and *Construction Methods* magazines.

Percy F. Loiselle, president of the Triangle Const. Co., of Kankakee, has been elected president of the Associated General Contractors of Illinois. Other officers were: William F. Kewley, of Springfield, vice-president; and Thomas Joyce Jr., also of Springfield, secretary-treasurer. New directors are: Robert Anderson, of Joliet, named for a one year term; Albert Huckba, of Mattoon, and Thomas F. Feiweiger, of Davenport, Ia., who will serve for three years.

How to make water seek higher levels

Unusual job—but a necessary one when you want to drain an excavation or siphon an overflow.

Of course, to do this job you require a suction pump. But it takes more than a good pump to do the job efficiently. It takes superior quality suction hose, too.

That's where Hewitt comes in!

Hewitt Rubber has developed a hose that is expressly designed for heavy-duty water suction and discharge service. It's tough, durable, long-lasting Ajax Water Suction Hose!

Its smooth bore tube assures fast water-flow and resists the scouring effects of muddy water. Its reinforcing spiral of spring-steel wire—completely embedded in the carcass—prevents hose collapse under heavy suction. And its tough, protective cover resists abrasion and checking.

You'll find Ajax Water Suction Hose especially suited for heavy-duty contractors' service and maintenance work.

So plan to use Ajax for your drainage operations. You'll agree it's the *right* hose for more efficient suction service. Phone the Hewitt distributor listed in the classified section of your phone directory. Or write to Hewitt Rubber Division, 240 Kensington Ave., Buffalo 5, N. Y.

You can depend on your equipment supply specialist

He's always ready to serve you. And he knows your job...your operations...your problems. Call on him at any time for advice. He'll recommend the exact Hewitt product especially designed to help improve the efficiency of your operations.

HEWITT RUBBER
DIVISION
HEWITT-ROBINS INCORPORATED
INDUSTRIAL HOSE • BELTING • PACKING

Ajax Water Suction Hose

The Ghost In Rev. 4

● And it was such a beautiful tracing when it first left the board – but look at the prints now, after that last revision . . . a nice big "ghost" firmly astride the front elevation. Moral . . . don't use inferior tracing cloth.

If this tracing had been on Arkwright, Rev. 4 would have produced prints just as sharp as the day a tracer first initialed it . . . because Arkwright's special mechanical process *prevents* "ghosts". This oil, wax and soap-free method of manufacture builds the translucency *all the way* through. Arkwright cloths *can't* discolor, grow brittle with age.

See for yourself how much better Arkwright is. Send for free working samples. Arkwright is sold by leading drawing material dealers everywhere. Arkwright Finishing Company, Providence, R. I.

All Arkwright Tracing Cloths have these 6 important advantages

1 *Erasures re-ink without "feathering"*
2 *Prints are always sharp and clean*
3 *Tracings never discolor or become brittle*
4 *No surface oils, soaps or waxes to dry out*
5 *No pinholes or thick threads*
6 *Mechanical processing creates permanent transparency*

Arkwright

TRACING CLOTHS

AMERICA'S STANDARD FOR OVER 25 YEARS

Manufacturers' Activities

Current developments among manufacturers relating to expansion of services, shifts in personnel, and other changes, include the following:

New Plant—The Philadelphia Division of the YALE & TOWNE MFG. CO. has moved into a new building at 205 East 43rd St., New York City, with its materials handling and technical sales service departments. . . . The first production unit of the new Willow Island, W. Va., plant of the Calco Chemical Division, AMERICAN CYANAMID CO., is now in operation. . . . Completion of a new V. & E. Mfg. Co. office, engineering and assembly building in Pasadena, Calif., has been announced. . . . THE LINDE AIR PRODUCTS CO. has started construction of an oxygen filling station and acetylene producing plant at Creve Coeur, Peoria, Ill. . . . FAIRBANKS-MORSE & CO. held a recent open house to mark the opening of its new office and warehouse addition at St. Louis, Mo. . . . MACK TRUCKS, INC. has disclosed that it is planning to spend $10,000,000 in the next two or three years for machinery, tooling, new buildings and renovation. . . . Construction is well advanced on a new plant for the HILLSMAN EQUIPMENT CO. in Melrose Park, Chicago. . . . THE AMERICAN BRAKE SHOE COMPANY'S two nonferrous foundries were recently completed at Niles, Ohio, and Meadville, Pa. . . . The Western Division of MONSANTO CHEMICAL CO. has announced plans to install a small plant at Decatur, Ill. . . . SCREEN EQUIPMENT CO., INC., has opened its new factory and general offices in Buffalo, N. Y. . . . ALLIS-CHALMERS CO. has just completed and occupied its newest branch buildings at Memphis, Tenn.

Field Sales Changes—T. C. Combs is now responsible for activities in the Southwest and Mexico for TIMBER STRUCTURES, INC. . . . William F. Lanius is sales representative at Portland, Ore., for the MARION POWER SHOVEL CO. . . . Appointment of George A. Baldwin as manager of the Los Angeles sales office of BLACKNER PUMP CO. has been announced. . . . J. J. Robinson and Glen L. Graff have been appointed divisional sales managers for the eastern and western divisions, respectively, for MARSH WALL PRODUCTS, INC., of Dover, Ohio. . . . JOHN A. ROEBLING'S SONS CO. has appointed L. H. Van Dike, Jr. as Detroit, Mich. representative. . . . Samuel A. Madrid is western repre-

BAKER Bulldozer and AC HD-19

DYNAMITE ON TRACKS

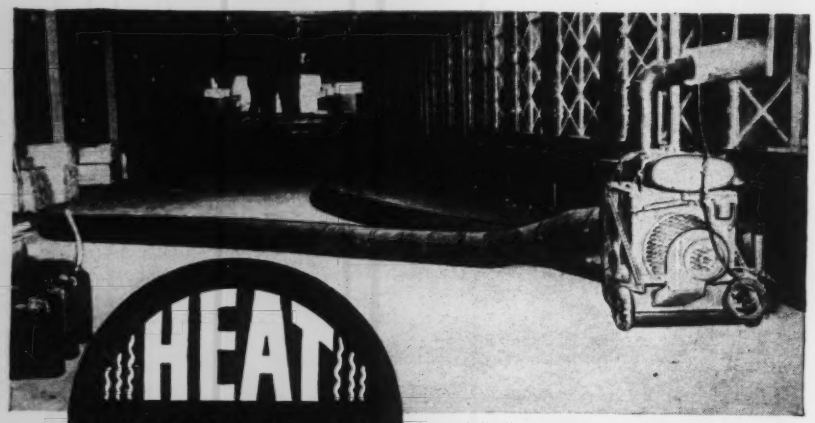
Here's the hardest hitting Bulldozing team in the business—the huge Allis-Chalmers HD-19 and Baker Bulldozer—over 48,000 pounds of "dynamite" on tracks.

Here's sure footed traction under *all* ground conditions—tremendous power for the toughest going—unusual speed and maneuverability for any job—which all adds up to increased yardage at the lowest net cost per yard.

Before you start your next job, get the complete story on this terrific team—take advantage of the advanced engineering, the improved design, the yardage boosting performance built into this world's largest, most powerful Bulldozer. Cable or Hydraulic Bulldozer and Gradebuilder available.

BAKER They Go Together! AC

Baker Mfg. Co., Springfield, Illinois



HEAT

WHERE YOU WANT IT
WHEN YOU WANT IT
WITHOUT WASTE

THE HERMAN NELSON PORTABLE HEATER---
TODAY'S MOST VERSATILE SOURCE OF HEAT!

Mobile HEAT — anywhere, anytime! Herman Nelson Portable Heaters protect men and working spaces, thaw out machinery, dry materials, ventilate confined areas. They circulate fresh, uncontaminated, heated air — without smoke, soot or open flame. With Herman Nelson Portable Heaters you can spot heat just where you need it . . . force heat to hard-to-reach places . . . do more work, regardless of the weather. This amazingly versatile heating unit is no larger than a kitchen stove, yet it generates enough heat for three ordinary 5-room houses!

CAN BE USED FOR:

SPACE HEATING of temporary buildings, storage sheds, repair shops, buildings under construction.

PREHEATING engines and all kinds of mechanical equipment.

SPOT HEATING of materials, workmen, machinery, storage tanks, tools.

THAWING frozen areas and machinery, wheels, gears, transmissions, caterpillars, etc.

DRYING and curing of materials, plaster, paint, mortar, concrete, etc.

VENTILATING and heating of manholes, tunnels, box cars, ship holds, confined areas of all kinds.

Write for Interesting, Free Booklet on "Cost Control"

THE HERMAN NELSON CORPORATION MOLINE ILLINOIS

SINCE 1906 MANUFACTURERS OF QUALITY HEATING AND VENTILATING PRODUCTS

MacArthur

37 YEARS INSTALLING PILES
OF EVERY TYPE

CAST-IN-PLACE CONCRETE
COMPOSITE
STEEL
SECTIONAL PIPE
TIMBER

SOIL AND ROCK BORINGS

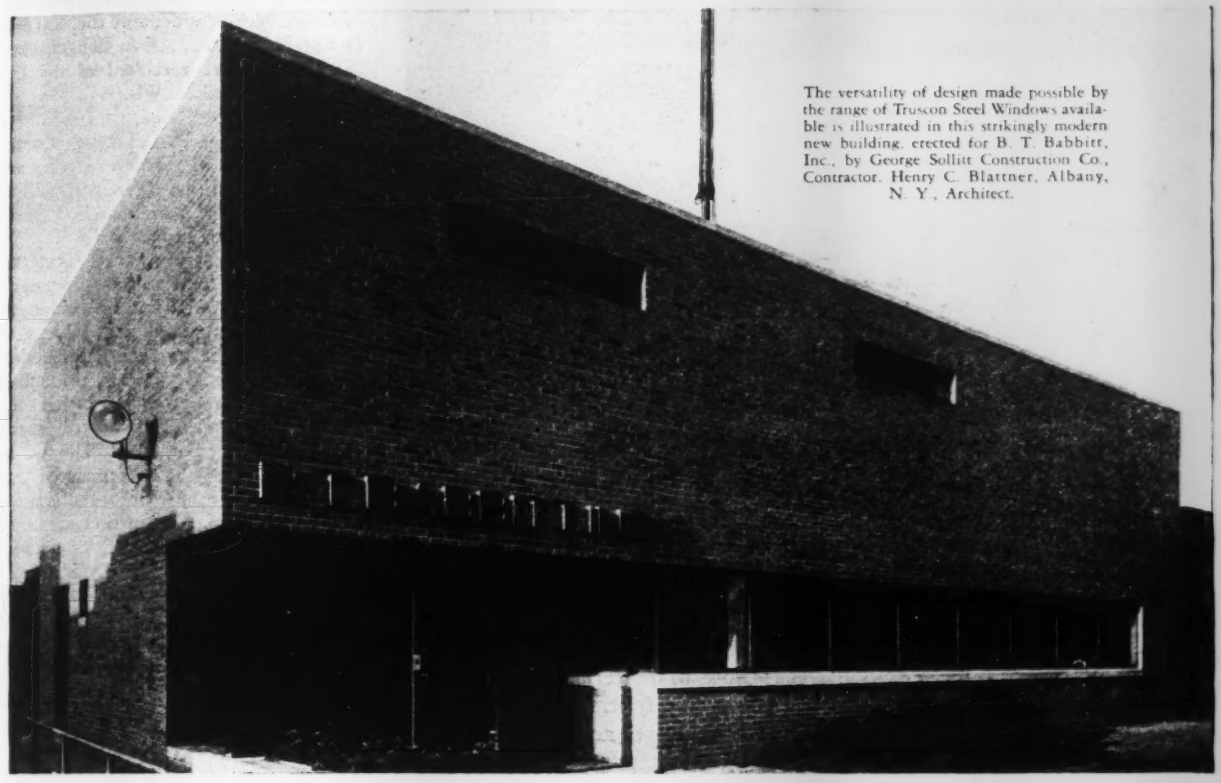
MacARTHUR CONCRETE PILE CORPORATION
18 EAST 48th STREET, NEW YORK 17, N. Y.
BOSTON • CINCINNATI • NEW ORLEANS

sentative for the SMITH ENGINEERING WORKS, of Milwaukee, Wis. . . . T. N. Barksdale has assumed new sales responsibilities at the BEMIS BRO. BAG Co., Memphis sales office. . . . Muzaffer Unsal, of Istanbul, Turkey, will represent the UNIVERSAL CONCRETE PIPE MACHINERY CO. in Turkey. . . . Jack Brand will handle industrial sales for Colorado for the THERMOID CO. of Trenton, N. J. . . . L. V. Williams recently joined the sales department of the WAGNER ELECTRIC CORPORATION'S branch at Atlanta, Ga. . . . W. D. Haley is district manager of the Pacific Northwest territory for the LIMA SHOVEL and CRANE DIVISION. . . .Norton P. Bosemer is now in charge of the Los Angeles office for TUBE TURNS, INC.

Headquarters Sales—R. J. Nymberg of Detroit, Mich. has become general sales manager of the HERCULES STEEL PRODUCTS CORP., Galion, Ohio. . . . Roy H. Warmee is sales manager of the Moduflow division, MINNEAPOLIS-HONEYWELL REGULATOR CO. . . . Appointment of H. B. Wilson to the post of sales engineer has been announced by the ATLAS EQUIPMENT CORP., Pittsburgh, Pa. . . . Joseph A. Sullivan has become manager of the advertising bureau of UNIVERSAL ATLAS CEMENT Co. . . . Steve C. Brown is now advertising manager of the AMERICAN HOIST & DERRICK CO. . . . C. C. Walker of Boston has been elected a commercial vice-president of the GENERAL ELECTRIC CO., responsible for customer relations in the New England territory. . . . H. M. Cahill is now sales manager of the Small Engine Department, Heavy Machinery Division, of the NORDBERG MFG. Co., Milwaukee, Wis. . . . R. H. Cochran has been named general sales manager of the METROPOLITAN PAVING BRICK Co.

Home Office Changes—The DRAVO CORPORATION of Pittsburgh, Pa., has appointed William H. Collins as director of advertising. . . . Frank L. Estep, electrical and mechanical engineer, has become associated with the BARIUM STEEL CORP. . . .Lucien W. Mueller has been elected chairman of the board of directors of the MUELLER CO. . . . William M. Lehmkuhl has been appointed assistant vice-president of the MASONITE CORP. . . . Carl F. Clausen has been named manager of the manufacturing research section for the PORTLAND CEMENT ASSOCIATION. . . . R. E. Keidel has joined the advertising department of the EUCLID ROAD MACHINERY CO. as assistant advertising manager. . . . Thomas Oxnard and John Morel have been elected directors of the SOUTHERN STATES IRON ROOFING CO. of Savannah, Ga. . . . Walter C. Robertson has been elected vice-president in charge of ex-

TRUSCON PLANNING BOARD



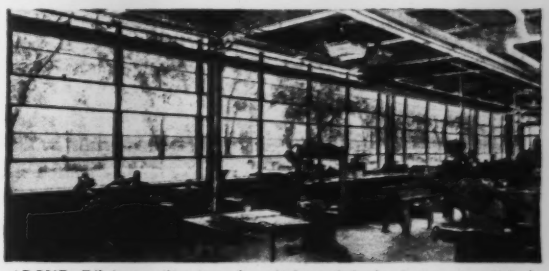
The versatility of design made possible by the range of Truscon Steel Windows available is illustrated in this strikingly modern new building, erected for B. T. Babbitt, Inc., by George Sollitt Construction Co., Contractor. Henry C. Blattner, Albany, N. Y., Architect.

TRUSCON STEEL WINDOWS

help achieve outstanding architectural beauty

AT LEFT: Truscon Intermediate Steel Casements (fixed type) lend impressive architectural dignity to Babbitt office interiors, in addition to admitting generous amounts of nature's free sunlight. Their exterior appearance provides a smart note of distinction in the modern facade.

ABOVE. The varying needs for ventilation in the B. T. Babbitt Building are met by Truscon Pivoted Steel Windows in wall at left, and Truscon Architectural Projected Steel Windows in wall at right.



ABOVE. Efficient utilization of sunlight and fresh air is accomplished by the ample glass areas and easily-controlled ventilators in the Truscon Pivoted Windows, which thus contribute to the pleasant working conditions within the Babbitt plant.

These three types of Truscon Steel Windows have been combined to establish the Babbitt structure as one of Chicago's most modern industrial buildings. Write for complete descriptive literature on the entire Truscon Steel Window line.

Pivoted Steel Windows

Architectural Projected Steel Windows

Intermediate Steel Casements

TRUSCON STEEL COMPANY YOUNGSTOWN 1, OHIO
Subsidiary of Republic Steel Corporation

PROVED BETTER... because they WORK BETTER!

MORRIS DREDGING PUMPS

In almost any dredging operation . . . *they give greater performance at lower maintenance cost*

● Purposely made for high vacuum, Morris Pumps dredge to greater depths and give up a higher percentage of sand, gravel and other abrasive materials.

● The proper relationship between shell and impeller designs produces smooth, easy flow of materials . . . without eddies, turbulence or excessive friction losses. This feature alone reduces wear, abrasion and power consumption.

● When long service finally requires renewal of a part, replacement on the Morris Dredging Pumps can be made easily, quickly and economically . . . *with only slight interruption of service.*

Morris Will Build a Dredge for Your Particular Job . . .

● All the components of the dredge—hull, rigging, hoist, spuds, ladder, ladder head, and cutter will be designed and built for the individual type of deposit and service you require. All excavating and auxiliary pumps are of the famous Morris Centrifugal type . . . driven by electric, Diesel or steam power, according to the needs of your job.

Morris Dredges Are Custom-Built . . . Yet Moderate in Cost

WRITE TODAY! Send for Free Bulletin No. 177. It illustrates and describes a wide range of dredges.

MORRIS MACHINE WORKS
Baldwinsville, N. Y.
Branch Offices in Principal Cities

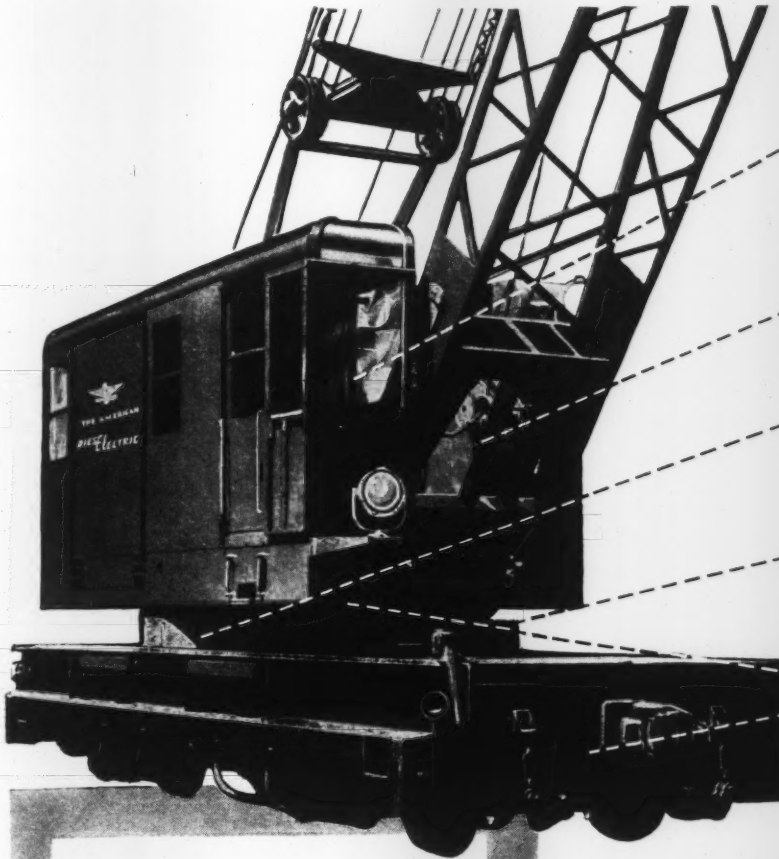
MORRIS CENTRIFUGAL PUMPS

port for the GAR WOOD INDUSTRIES, INC. . . .Elmer W. Noxon has assumed the presidency of the DIXIE MACHINERY MFG. Co. of St. Louis. . . . W. E. Day is now director of research for MACK TRUCKS. . . . Calvert Carey has been elected president and Fred Dunning executive vice-president of the YALE & TOWNE MFG. CO. . . . .E A. Longenecker has been elected president of the LE-ROI Co., Milwaukee, Wis.

Distributors — THE LIQUID CONDITIONING CORP. of Linden, N. J., announces the addition of John R. Lill to the staff of its Washington. D. C. representative, L. S. Luther & Co. . . . W. K. Sowdon Co., New York City, has severed connection as manufacturer's representative for sanitary equipment with the AMERICAN WELL WORKS of Aurora, Ill., but are continuing other representations. . . . W. B. Whenthoff is again in charge of marketing the products of TUBE TURNS, INC., in the Houston, Tex. area. . . . The G. A. COFFEY CO. of 123 Commerce St., Dallas, Tex., is now representing the RALPH B. CARTER CO. in that area. . . . THE SARAN LINED PIPE CO., a newly organized firm, will act as distributors for the DOW CHEMICAL Co's recently developed specialty pipe and fittings. . . . HUNT-JORDAN CO., with offices at 1147 S. Independence Blvd., Chicago, has been organized to handle representation for resistance welding equipment of the PROGRESSIVE WELDER CO., Detroit.

Plant Personnel—R. G. Carter, former service engineer, is now assistant service manager for the LIMA SHOVEL AND CRANE DIVISION. . . .H. A. Pratt is parts and service manager for the DAVEY COMPRESSOR CO., at Kent, Ohio. . . . N. G. Belury has been appointed vice-president of the Engineered Castings Division of the AMERICAN BRAKE SHOE CO. . . . Frank E. Lobaugh is now manager of the Lumnite Division, UNIVERSAL ATLAS CEMENT CO. . . . THE NATIONAL SUPPLY CO. has announced the transfer of Lloyd A. Harris, diesel engine specialist, from the company's Superior engine division to the plant products division. . . . Herman F. Haven has been appointed western division parts manager for the CATERPILLAR TRACTOR CO.

Personalities—Randolph H. Hoy, for the past nineteen years sales manager of the Pittsburgh territory for the UNIVERSAL ATLAS CEMENT CO., retired recently after 40 years of service with the company. . . . H. A. Scribner, president of RUSSELL T. GRAY, INC., Chicago, is chairman of the 1948 Road Show Promotion Committee of the AMERICAN ROAD BUILDERS ASSOCIATION. . . . Ray



FIRST graduated air controls

FIRST with friction clutch boom hoist

FIRST 14-inch safety clearance on all models

FIRST roller bearing turntable

FIRST welded carbody and machinery deck

THE American

DIESELECTRIC

Locomotive Crane

Continues an Impressive List of...

"FIRSTS"!

DIESEL-ELECTRIC LOCOMOTIVE CRANE. PATENT NO. 2083460. TOUCH CONTROL, PATENT NO. 2370856.

Here is the remarkable new locomotive crane that writes off its own cost in five years. The crane with "DIESEL power to the deck; ELECTRIC power to the trucks." It's the biggest locomotive crane news in years.

For the background of this news, let's look at the record. Named above are five of the most important all-time developments in locomotive crane design. *All five* are American Hoist "firsts"! In addition, more than a dozen other major improvements (travel throw-out clutch, enclosed travel gears, etc.) could be added to the list. Nearly all of these advancements have been adapted or copied widely.

The DIESELECTRIC is, indeed, revolutionary. More than *seven tons* of wearing parts have been eliminated. Maintenance expense has been cut 25% to 50%. Every part of the crane is new—designed specifically and solely for the DIESELECTRIC. The past record of all "American" Locomotive Cranes, and the long years of testing and development that went into the DIESELECTRIC assure it a brilliant future.

Write today for New Catalog 600-L-4.

American Hoist

and DERRICK COMPANY

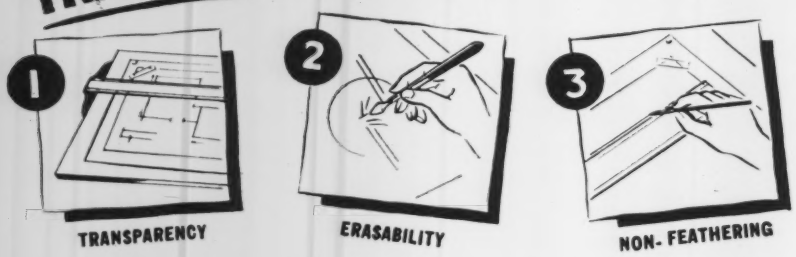
St. Paul 1, Minnesota

Sales Offices:
New York
Pittsburgh
Chicago
New Orleans
San Francisco

PLANT No. 2—SO. KEARNY, NEW JERSEY

700

GIVE YOUR TRACING CLOTH the 1·2·3·test–



MICRO-WEAVE and PEL-X win on ALL three

Send for Samples.

Whatever you want most in a tracing cloth, you'll find it in these two great products of Holliston Mills. Try them both and you'll agree: it pays to make sure you get "all three": maximum transparency and maximum erasability and minimum feathering.

THE HOLLISTON MILLS, INC.
NORWOOD, MASSACHUSETTS NEW YORK CHICAGO

45 TONS

OF 15 FOOT PENSTOCK TUBE

is successfully transported on this

ROGERS HEAVY DUTY TRAILER

Extreme lengthwise and crosswise axle oscillation is attained in the rear end design of this type D Trailer. This load rides evenly and easily as the trailer wheels readily conform to roadbed irregularities.

EXPERIENCE builds 'em • PERFORMANCE sells 'em

ROGERS BROTHERS CORPORATION
DESIGNERS and BUILDERS of HEAVY DUTY TRAILERS SINCE 1915
135 ORCHARD ST. ALBION, PENNA.

Perin, for 35 years the West Coast representative for ELWELL-PARKER TRUCKS, has been elected president of the Materials Handling Association of northern California. . . . Charles M. Bindner and T. A. Oberhellmann have organized HAMMERMILLS, INC., at St. Louis, Mo., for the manufacture of a complete line of hammermills for use in the cement, construction and mining industries. . . . J. W. McCoy has retired as vice-president and member of the executive committee of E. I. DU PONT DE NEMOURS & Co. . . . C. F. Winchester, for seven years executive secretary of the ASSOCIATED EQUIPMENT DISTRIBUTORS, has established new offices in the Denrike Building, 1010 Vermont Ave. N.W., Washington 5, D. C.

Miscellany — The ALLIS-CHALMERS MFG. Co. of Milwaukee, Wis., recently celebrated its 100th anniversary. . . . MERIT PAPER CORP. has announced the establishment of a Building Trades Division to handle building papers for roofing, siding, and other uses. . . . JAEGER MACHINE Co. has moved its export division to 550 West Spring St., Columbus 16, Ohio. . . . JOHNS-MANVILLE CORP. has announced the purchase of VAN CLEEF BROS., INC., of Chicago, manufacturers of industrial and automotive products. . . . THE FIBRE CONDUIT Co., of Orangeburg, N. Y., has changed its name to the ORANGEBURG MANUFACTURING Co., INC.

New Engineering Books

(*Continued from page* 112)

FIELD PRACTICE—Volume III of Data Book for Civil Engineers—By Elwyn E. Seelye. 306 pp. John Wiley & Sons, New York 16. Chapman & Hall, London. $4.50.

WIRING A CONTINENT—History of the Telegraph Industry in the U. S. from 1832 to 1866—By R. L. Thompson. 544 pp. Princeton University Press, Princeton, N. J. $7.50.

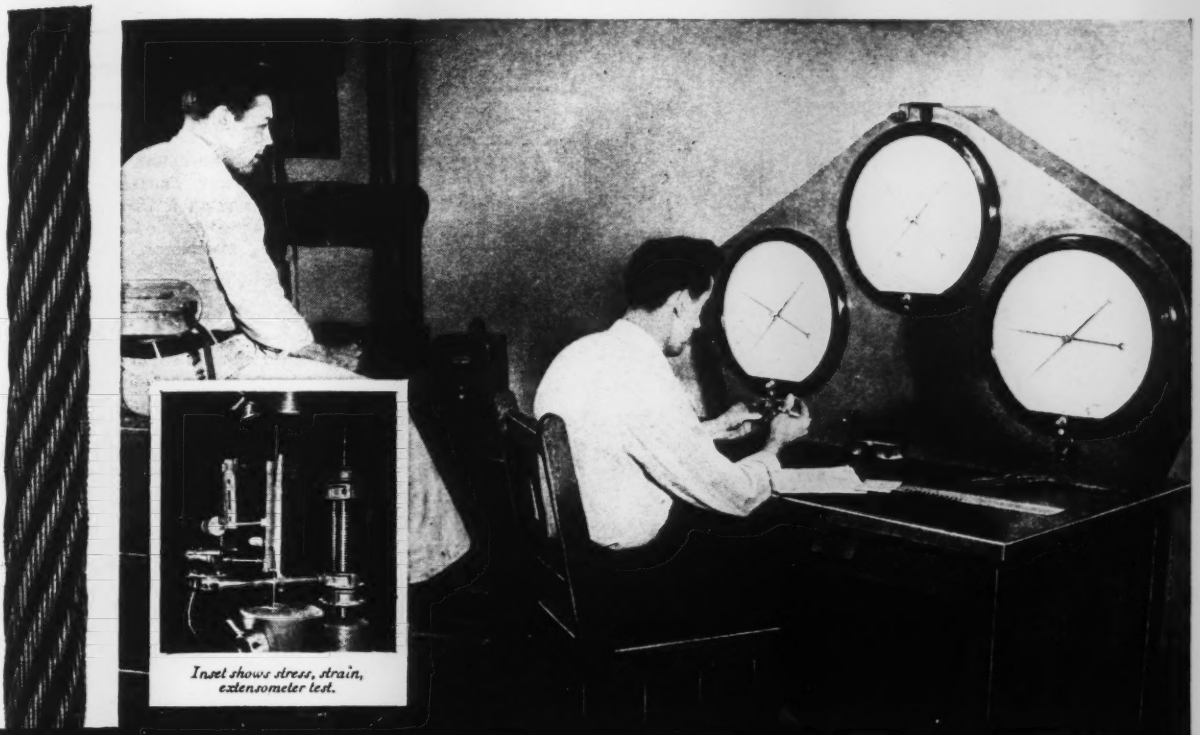
MECHANICA ELASTICA—Tercera Edicion—By Alfonso Pens Boeuf. 412 pp. J. S. Tormo, 1 Calle de Alfonso XII 3, Escuela de Caminos, Madrid, Spain.

SAGA IN STEEL AND CONCRETE—Norwegian Engineers in America—By Kenneth Bjork. 504 pp. Norwegian-American Historical Assoc., Northfield, Minnesota. $4.

INDUSTRIAL HEALTH ENGINEERING—By A. D. Brandt. 395 pp. John Wiley & Sons, New York 16. Chapman & Hall, London. $6.

IDRAULICA—By Umberto Puppini. 678 pp. Nicola Zanichelli, Bologna, Italy.

LA REGOLAZIONE DELLE TURBINE IDRAULICHE—By G. Evangelisti. 274 pp. Nicola Zanichelli, Bologna, Italy.



Inset shows stress, strain, extensometer test.

How to Measure the Muscle in Rope Wire

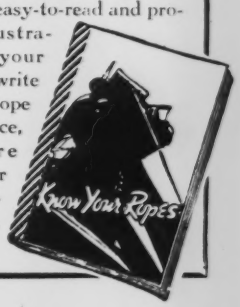
Measuring the muscle—or tensile strength—of rope is one of many important tests used in grading Wickwire Rope. And the engineers who supervise these tests are tough taskmasters.

Before they release a single coil of wire to the Rope Mill, they take two samples from each end of every coil. These samples are gauged for size and roundness. Then the wire is subjected to the extensometer test, the tensile, torsion and elongation tests. Tolerances are even more exacting than those established by the industry; any wire not meeting the standards is rejected. Colored tags listing size, strength and other data are affixed to acceptable coils. These tags stay on the coils until they are made into wire rope—and the data they contain is kept on file for future reference

This meticulous adherance to standards characterizes every phase of Wickwire Rope fabrication. Coupled with the services of Wickwire Distributors and Rope Engineers in specifying the rope with the right kind of muscle to do your hoisting or hauling job, it is your assurance of the utmost in performance, safety and long rope life. Wickwire Rope is available in all sizes and constructions, both regular lay and WISSCOLAY *Pre*formed. Next time you order wire rope make it Wickwire Rope. After checking its performance we feel certain that you'll keep on ordering it.

THIS 82-PAGE BOOK ON WIRE ROPE IS FREE. WRITE FOR YOUR COPY TODAY!

Thousands of wire rope users have found that the information packed in the pages of "Know Your Ropes" has made their work easier. It's full of suggestions on proper selection, application and usage of wire rope. It's easy-to-read and profusely illustrated. For your free copy, write —Wire Rope Sales Office, Wickwire Spencer Steel, Palmer, Mass.



WICKWIRE ROPE

CF&I & SUBSIDIARIES

A PRODUCT OF THE WICKWIRE SPENCER STEEL DIVISION OF THE COLORADO FUEL AND IRON CORPORATION

WIRE ROPE SALES OFFICE AND PLANT—Palmer, Mass. **EXECUTIVE OFFICE**—500 Fifth Avenue, New York 18, N. Y.

SALES OFFICES—Abilene (Tex.) • Boston • Buffalo • Chattanooga • Chicago • Denver • Detroit • Emlenton (Pa.) • Fort Worth • Houston • New York • Philadelphia • Tulsa

PACIFIC COAST SUBSIDIARY—The California Wire Cloth Corporation, Oakland 6, California

Best way to get supplies fast

Air Express is the fastest possible way to get the supplies and equipment you need. That's because your shipments go on *every* flight of all the Scheduled Airlines. No waiting around. And Air Express packages are picked up and delivered right to your door at no extra cost.

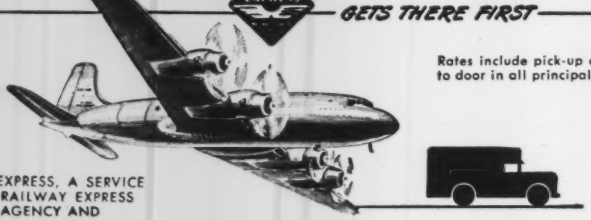
This speedy service helps your business *keep moving* — lets you serve your customers better. Coast-to-coast delivery overnight is now routine. And with *low* rates, there's profit for you in Air Express. Use it regularly!

Specify Air Express-World's Fastest Shipping Method

- Low rates — special pick-up and delivery in principal U. S. towns and cities at no extra cost. • Moves on all flights of all Scheduled Airlines.
- Air-Rail between 22,000 off-airline offices.
- Direct air service to and from scores of foreign countries.

True case history: Electric switches located in Tulsa, Okla., were wanted in Newark, N. J., to complete equipment and fulfill contract date. **21½** lb. package picked up the 17th at 5:05 P.M., delivered 3:35 A.M., just 10 hours later. **1239** miles, Air Express charge only **$8.10.** Other weights, any distance, similarly inexpensive and *fast.* Just 'phone your local Air Express Division, Railway Express Agency for fast shipping action.

AIR EXPRESS
AIR EXPRESS GETS THERE FIRST



Rates include pick-up and delivery door to door in all principal towns and cities.

AIR EXPRESS, A SERVICE OF RAILWAY EXPRESS AGENCY AND

THE SCHEDULED AIRLINES OF THE UNITED STATES

Reports and Pamphlets

AN ECONOMIC APPRAISAL OF THE ST. LAWRENCE SEAWAY PROJECT—Prepared by the Transportation Division, Bureau of Foreign and Domestic Commerce, Department of Commerce, Washington 25, D. C.

PROCEEDINGS OF THE EIGHTH ANNUAL HIGHWAY ENGINEERING CONFERENCE—Bulletin No. 33—Utah Engineering Experiment Station, University of Utah, Salt Lake City, Utah.

HOLLANDS RECONSTRUCTION IN FACTS AND FIGURES—Information Service of the Ministry of Reconstruction and Housing, The Hague, Holland.

ROAD BUILDING IN THE PUBLIC INTEREST—By B. E. Hutchinson. Available on request to Automobile Manufacturers Assoc., New Center Building, Detroit 2, Michigan.

PROBLEMS OF AERODYNAMIC AND HYDRODYNAMIC STABILITY—By D. B. Steinman. Reprinted from Proceedings of the Third Hydraulics Conference, Bulletin 31, University of Iowa, Iowa City, Iowa.

COMMMITTEE ON PUBLIC TRANSPORTATION—Bulletin No. 129—American Road Builders' Association, 1319 F St. N. W. Washington 4, D. C.

FLEXIBLE PAVEMENT DESIGN—Bulletin No. 119—American Road Builders' Association 1319 F St. N. W., Washington 4, D. C.

MANPOWER AND MATERIAL REQUIREMENTS FOR A HOUSING PROGRAM IN CANADA—Department of Reconstruction and Supply, Ottawa, Ontario, Canada. 50c.

THE LABOUR VALUE OF THE BUILDING DOLLAR—By O. J. Firestone. Department of Finance, Housing Administration, Ottawa, Ontario, Canada. 25c.

REPORT ON A MASTER HIGHWAY PLAN FOR THE BOSTON METROPOLITAN AREA—Charles A. Maguire and Associates, 11 Pemberton Square, Boston 8, Mass.

NEW JERSEY'S FIRST PARKWAY—ROUTE 4—State Highway Department, Trenton, New Jersey.

MODERN FINANCING METHODS — C. I. T. Corporation, 1 Park Ave., New York 16.

TECHNIQUE OF HOUSE NAILING—By Forest Products Laboratory. Available through The Office of the Administrator, Housing and Home Finance Agency, Washington, D. C. 20c.

THE STATE OF THE COMPANY—Timken Roller Bearing Company, Canton, Ohio.

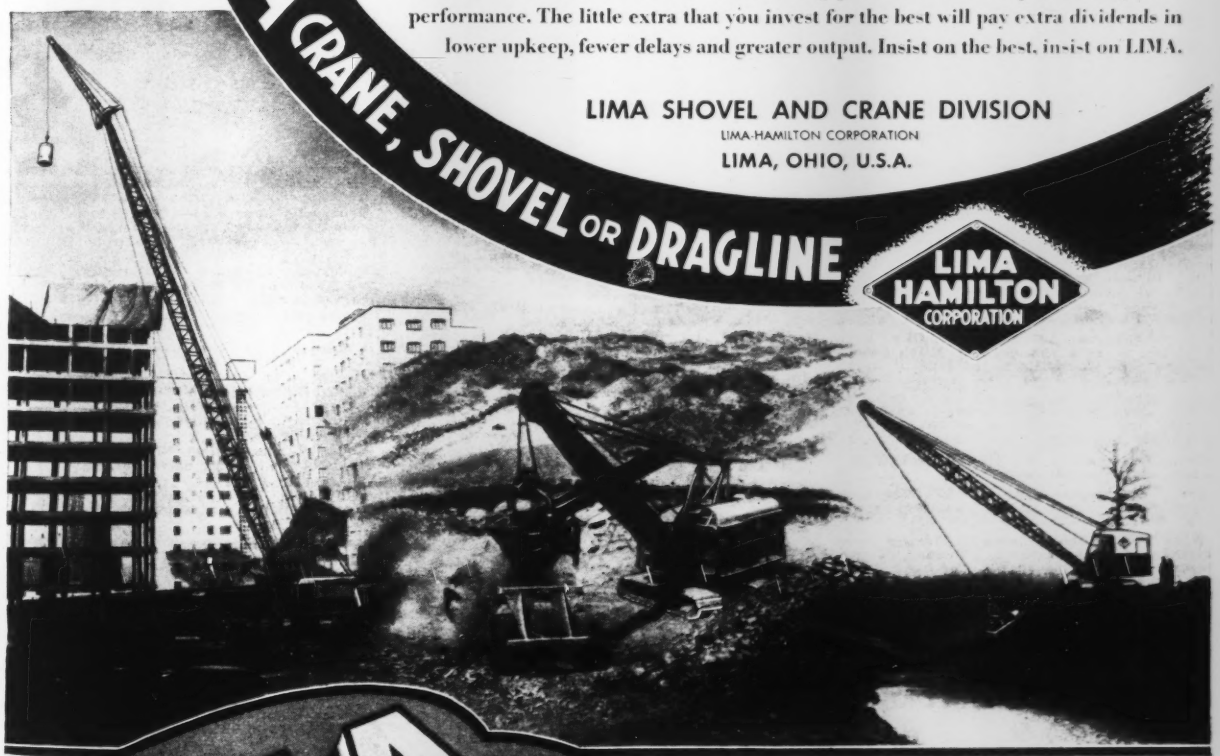
DO YOUR EXCAVATING and MATERIAL HANDLING JOBS Faster for Less

with a LIMA CRANE, SHOVEL OR DRAGLINE

Owners and operators alike are enthusiastic about the fast digging cycles, low cost of maintenance, ease of operation, and exceptional fuel and lubrication economies of LIMA shovels, cranes and draglines. Their superior performance in all classes of work is a topic of conversation with users who make it their business to know about the fine points of all makes of shovels, cranes and draglines. This comparison has resulted in a steady increase in the number of LIMAS in quarries, coal and metal mines, gravel pits, brick plants, timber and construction work of all kinds. It is convincing proof of LIMA'S superior design and performance. The little extra that you invest for the best will pay extra dividends in lower upkeep, fewer delays and greater output. Insist on the best, insist on LIMA.

LIMA SHOVEL AND CRANE DIVISION
LIMA-HAMILTON CORPORATION
LIMA, OHIO, U.S.A.

LIMA HAMILTON CORPORATION



LIMA
CRANES
SHOVELS
DRAGLINES

DIVISIONS OF LIMA-HAMILTON CORPORATION
Lima Locomotive Works Division
Lima Shovel and Crane Division
Lima, Ohio

Hooven, Owens, Rentschler Co.
Niles Tool Works Co.
Hamilton, Ohio

CONSTRUCTION REPORTS

Proposed Work

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 18, N. Y.
ELSIE EAVES, Manager J. A. MAHONEY, Reports E. R. BIGGERSTAFF, M. R. ROESSLER, Statistics

WATER SUPPLY

PROPOSED WORK

Ala., Tuscumbia — City, water filtration plant, exten. watermains. **$100,000.** J. W. Goodwin Eng. Co., 726 S. 29 St., Birmingham, consult. engr.

Ky., Murray—City, WW sys. Over **$100,000.**

Mich., Holland—Bd. Pub. Wks., M. C. Westrate, supt., pipeline and softening plant. **$700,000.** Consoer, Townsend & Assoc., 351 E. Ohio St., Chicago, Ill., consult. engrs.

Mo., Warrensburg—Warrensburg & Pertle Springs Waterworks Co., Warrensburg, WW imprvs., incl. tanks, mains, etc. **$104,500.**

N. C., Kinston—Town, voted bonds, water sys. imprvs. **$105,000.** CD 11/12—ENR 11/27.

Tex., Athens—City, bond election Jan. 9, 19,300 ft. 6 and 8 in. c.i. watermains, **$60,000;** 600,000 gal. steel storage tank and tower, **$90,000.** CD 9/28/45—ENR 10/11/45.

Tex., Ennis—City, WW sys. extens., imprvs. **$100,000.**

●**Tex., Lubbock** — City, Homer A. Hunter, mayor, voted bonds addnl. WW sys. imprvs., overhauling and expanded system planned. **$1,000,000.** CD 12/19/45—ENR 1/10/46.

Wis., Wausau—City, 5 m.g. rein.-con. reservoir. **$205,950.** J. Donohue Eng. Co., 608 N. 8 St., consult. engr. A. E. Becher, city engr. CD 3/13—ENR 4/3.

SEWERS, WASTE DISPOSAL

PROPOSED WORK

Calif., Irvington—Irvington Sanitary Dist., 103 Mission St., voted **$120,000** bonds, sewage treatment and disposal plant. Roy Edwin Ramseier, 3618 Parker St., Berkeley, consult. engr.

Calif., Oceanside—City, Loama Alta Canyon trunk lines, and laterals proj. $105,000. Leeds, Hill & Jewett, 601 W. 5 St., Los Angeles, consult. engrs.

Calif., Susanville—Susanville Sanitary Dist., Susanville, sewage disposal plant. **$120,000.** T. W. Ogilvie, Susanville, consult. engr.

Ill., Plymouth—Bd. Local Imprvts., Plymouth, sewage treatment plant, sewerage sys. **$120,000.** T. Hardman & Assocs., Hippodrome Bldg., Terre Haute, consult. engrs.

Ind., Anderson—Bd. P. Wks., City Hall, 16,000 lin. ft. rein.-con. Stanley Ditch Sewer. **$600,000.** M. A. Milling, 7 Griffith Bldg., consult. engr.

Mo., Excelsior Springs — City, defeated bonds, sewage treatment plant, **$286,000,** sanitary and storm sewers, **$47,000.** Project indefinitely postponed. CD 7/25—ENR 8/21.

Tex., Ennis—City, sanitary sewerage sys. extens., imprvs. **$100,000.**

Tex., Texarkana—City, T. E. Wrayford, mayor, voted bonds, addnl. sanitary sewer lines. **$400,000.** CD 3/10—ENR 3/13.

Wis., Thiensville—Thiensville-Mequon Metropolitan Sewerage Comn., Mequon, 7 mi. sanitary sewers. **$300,000.** Consoer, Townsend & Assoc., 351 E. Ohio Ave., Chicago, Ill., probable consult. engrs.

Wyo., Rock Springs—City, sewage plant. **$310,000.** R. L. Streeter, P. O. Box 2010, Casper, consult. engr. CD 1/22—ENR 2/6.

Ont., Collingwood — Municipality, sewage disposal plant, storm and sanitary sewers, pump. station. **$575,000.** A. MacRae, Collingwood, town engr. Ratepayers vote Jan. 5. CD 1/28—ENR 2/20.

Ont., Port Stanley—Municipality, sewerage sys. **$256,000.** Ratepayers voted against same. CD 8/21—ENR 9/4.

BRIDGES

PROPOSED WORK

Pennsylvania—State Hy. Dpt., Harrisburg, reconstructing bridge to carry tracks of Pennsylvania R. R. Co. across the Industrial Hy. and across tracks of Reading Co. R. R. **$120,000** for bridge **$105,000** for adjoining hy. proj.; reconstructing dismantled hy. bridge across the Susquehanna River to link Retreat State Hospital with Route 11, Luzerne Co. **$600,000.** E. L. Schmidt, c/o owner, ch. engr.

STREETS AND ROADS

PROPOSED WORK

Fla., Tallahassee—City, bond election Jan. 27, imprv. streets. **$750,000.**

●**Georgia**—State Hy. Dpt., Atlanta, 12 mi. highway, connecting Coastal Hy. with Jekyll Island. **$1,500,000.** Sverdrup & Parcel, Syndicate Trust Bldg., St. Louis 1, Mo., consult. engrs.

Ga., Atlanta—Fulton Co., Courthouse, imprv. W. North Ave., **$105,000;** Hollywood Rr., **$95,000;** King-Arnall Rd., **$110,000;** Collier and Simpson Rds., **$205,000;** exten. New Marietta Hy. to Hightower Rd., **$190,000;** raising Bolton Rd. near Chattahoochee River, **$86,000.**

●**New York**—Dpt. P. Wks., C. H. Sells, supt., Albany, N. Y., plans 2 arterial highways and altering existing streets in Poughkeepsie, Dutchess Co. **$7,642,000.**

●**New York**—Dpt. P. Wks., Albany, plans 25.15 mi. Urban arterial hys. incl. Court St.—Vestal Ave. arterial Rt. and Hy. connections, and Brandywine Ave. arterial Rt. and Hy. connection Binghamton; Main St. By-Pass Arterial Rt. and Hy. Connection, Binghamton and Johnson City, Main St., By-Pass, Endicott, also constructing bridge and connection Rt. 17, Johnson City and Endicott-McKinley Ave. Bridge. **$20,600,000.**

Okla., Wewoka — Seminole Co., grading, drainage and gravel surface County Rd. 99-B from Bowlegs to Wewoka. **$80,000;** County Rd. 99-A from Cromwell to Seminole, **$75,000.** Roy Grace, Wewoka, engr.

Tex., Bay City—City, Richard C. Gusman, mayor, voted bonds, street paving. **$150,000.** J. Montgomery, Littlefield Bldg., **Austin** consult. engr. CD 8/17/45—ENR 9/6/45.

Tex., Meredian — Bosque Co., c/o judge, Courthouse Bldg., voted bonds, farm to market roads, 16 mi. from Iredell southwest to county line, **$70,000;** 23 mi. from Meredian through Morgan to Kopperl, **$100,000;** 10 mi. from near Clifton west to county line, **$50,000.** CD 11/20.

Tex., Seminole—Gaines Co., c/o Judge, Courthouse, voted bonds, road construction 17 mi. southwest toward New Mexico Border, **$125,000;** 14 mi. between Hy. 180 and Hy. 14, northwest of Seminole, **$100,000;** farm-to-market road 18 mi. between Hy. 180 and Seagraves, **$150,000.**

Tex., Victoria — Victoria Co., c/o Judge, Courthouse Bldg., voted bonds, road imprvs. 14 mi. from Hy. 295 northeast to Jackson Co. line, **$250,000;** 22 mi. Victoria southeast to Calhoun Co. line, **$400,000;** 17 mi. from Hy. 87 near Victoria northwest to DeWitt Co. line, **$350,000.** CD 11/20.

Tex., Waller—Waller Co., J. C. Winfree, judge, Courthouse, road grading and drainage work, **$100,000;** 12 mi. asphalt road paving southwest from Waller, **$150,000.** McCormick & Teller, 1917 Westheimer Rd., Houston, consult. engrs.

Wis., Fond du Lac—Fond du Lac Co., grading, draining Co. Trunk Hy. F **$100,000;** Co. Trunk Hy. G **$50,000;** Co. Trunk Hy. W **$55,000;** Co. Trunk Hy. C, **$25,000;** Co. Trunk Hy. AS, **$40,000** and Co. Trunk Hy. EE and E, **$30,000.** John Bottkol, Court House co. engr.

EARTHWORK, WATERWAYS

PROPOSED WORK

†**Oregon** — Bureau Reclamation, Dpt. Interior, Bend, completing Wickiup Dam and relocated Forest Service Road at Wickiup Dam, on the Deschutes River about 15 mi. by road west of Lapine.

Tex., Brownwood — Brown County Water Imprvt. Dist. 2, Brownwood, irrigation water and facilities from Lake Brownwood to the Dist. **$150,000.**

Tex., Houston—San Jacinto Memorial Park Cemetery, c/o Miles Strickland, 2nd Natl. Bank Bldg., earthen lakes, grading, landscaping drainage. **$150,000.**

Tex., Laredo—City, Hugh S. Cluck, mayor, enlarging dam creating a lake, from lake area of ½ mi. wide and 2 mi. long, to 2 mi. wide and 8 mi. long. **$300,000.**

Ontario — Province of Ontario, Toronto, remedy shoreline erosion between Scarboro and Grimsby by constructing staggered rows of pilings exten. at right angles several hundred ft. into Lake Ontario. **$100,000.** Ministry of Planning, Toronto, engr.

AIRPORTS & AIRBASES

PROPOSED WORK

Ark., Pine Bluff — AIRPORT — City, c/o Mayor, Pine Bluff, voted $350,000 bonds, imprv. Grider Field Airport. **$800,000.** CD 1/22—ENR 3/6.

Okla., Bartlesville — AIRPORT—City, municipal airport. **$408,000.** CAA. J. E. McCormick, city engr. CD 1/11/45—ENR 1/25/46.

Tex., Marshall—AIRPORT—Harrison Co., c/o Judge, airport, 2 landing strips (Class 2); paving 1 runway (Class 2), taxiway, apron, access road. **$230,760.** CAA. F. M. Freemont & Assoc. Marshall, consult. engrs. CD 1/15—ENR 2/6.

LATIN AMERICA

Argentina, Buenos Aires—Republic of Argentina, Buenos Aires, plans hydro electric power project. Over **$500,000.** Ministry of Works, Buenos Aires, engr.

Argentina, Cordoba—Republic of Argentina, Buenos Aires, plans airport. **$150,000.** Dpt. Air, c/o Secy., Brigadier de la Colina, Buenos Aires, engr.

Argentina, El Palomar—Republic of Argentina, Buenos Aires, plans 400 dwellings Military Air Base. **$225,000.** Dpt. Air, Buenos Aires, engr.

Argentina, Salta — Republic of Argentina, Buenos Aires, plans airport. **$200,000.** Dpt. Air, c/o Brigadier de la Colina, secy, Buenos Aires, engr.

Argentina, Tandil—Republic of Argentina, Buenos Aires, plans airport. **$150,000.** Dpt. Air, Secy. Brigadier de la Colina, engr.

Mexico, Guaymas—Fomento Maritimo, S. A. Ave. XVI, 521, Guaymas, Sonora, plans sea food cannery and meat and vegetables packing house. **$500,000.**

Mexico, Mexico City—Alumino Industrial Mexicano S.A., Mexico City, plans aluminum paste plant. **$200,000.**

Mexico, Mexico City—Mexican Govt., Secria de Defensa Nacional, Mexico, D.F., Mexico, plans military home colony for 785 high ranking army officers and families. **$2,150,000.**

Venezuela—Banco de Obrero, Caracas, plans housing for working men, countrywide **$10,000,000.**

Venezuela—Federal Govt., Caracas, preliminary plans by Rafel Bergamin, archt., subway, eliminating traffic extending Catia to Petare **$15,000,000.**

Venezuela—Ministry Pub. Wks. (Dr. E. Pardo Stolk), Caracas, plans dredging port installations and port housing at ports of La Guaira, Guanta and Maracaibo, **$25,000,000;** irrigation project in states of Guarico, Anzoategui and Cojedes, **$3,000,000.**

Venezuela—State of Monagas (Rafael Rodriquez Mendez, Gov.), plans WW, sewerage, streets and roads, in rural sections. **$400,000.**

Venezuela, Caracas — Cia. Electricidad de Caracas, Oscar Augusto Machado, mngr., Caracas, plans 100,000 kls. electrical plant. **$11,500,000.**

Venezuela, El Rodeo—Sr. Geronimo Salcedo, c/o El Valle de El Rodeo, plans sugar mill on the Salcedo sugar fields in Lara. **$750,000.**

Venezuela, Guigue—State of Yaracuy, plans health center. **$400,000.**

Venezuela, La Guaira—Ministry of Pub. Wks., Caracas, plans 300 housing units. **$1,500,000.**

Venezuela, Maracaibo—State of Zulia, Capitol City Maracaibo, (Dr. Felipe Hernandez), plans roads, WW, sewerage, bridges, public bldgs. **$1,000,000.**

Venezuela, Maracaibo—Workers Bank, Caracas, plans 500 housing units. **$1,200,000.**

Venezuela, Puerto La Cruz—Ministry Pub. Wks., Dr. E. Pardo Stolk, minister, plans 200 housing units in Guanta-Puerto La Cruz area. **$800,000.**

PUBLIC BUILDINGS

PROPOSED WORK

Calif., Placerville—El Dorado Co., Placerville, plans by H. J. Devine Co., Cronan Bldg., Sacramento, hospital. **$275,000.** Sidney La Geare, Placerville, engr. CD 9/8/44—ENR 9/21/44.

●**Calif., San Jose**—Bd. Educ., Almaden and Auzerais Aves., **$9,000,000** bond election Feb. 17, school building program. CD 1/8—ENR 1/23.

Conn., Fairfield—Town, Dr. Carlyle G. Hoyt, supt., Fairfield, 18 room brick, steel school, incl. library, science, health rooms, offices etc., Sturges Park in Mill Plain Sect. **$500,000.**

Conn., Hartford—City, Bd. Educ., 249 High St., 2 story, bsmnt., brick, steel Junior High School, New Britain Ave., **$750,000;** 2 story, bsmnt., brick, steel Rawson Grade School addn., **$350,000.**

● **Conn., Mansfield**—State, Fred R. Zeller, comptroller, State Capitol, Hartford, plans by Henry F. Ludorf, 100 Pearl St., Hartford, brick, steel, concrete state hospital and training school. **$1,500,000.** CD 8/13—ENR 9/4.

●**Fla., Gainesville**—City, plans by Samuel Hannaford & Sons, Dixie Terminal Bldg., Cincinnati, O., hospital. **$1,250,000.**

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PUBLIC BLDGS. (Proposed Work, Cont'd.)

Ga., Macon — Bibb Co., Macon, plans by Dennis & Dennis, Macon, remodeling courthouse. **$500,000.**

Ill., Streator — Bd. Educ. Streator School Dist., Streator, plans by Wm. B. Ittner, Inc., 408 Bd. Educ. Bldg., 911 Locust St., St. Louis, Zone 1, Mo., brick, rein.-con. school. **$650,000** bond election in January.

Ind., Terre Haute—Bd. School Trustees, 6½ and Walnut Sts., preliminary plans by Miller & Vrydagh, 300 Opera House Bldg., 1 story, brick, rein.-con., steel Gerstmeyer High School. **$250,000.**

Ind., South Whitley — Town Bd., Lucy Keller, clk., power plant imprvs. **$105,000.** Bond election soon.

Ia., Osceola—Clark Co., voted **$300,000** bonds, hospital.

Ia., Spencer — Bd. Educ., voted **$400,000,** schools.

Kan., Coffeyville — City, voted **$825,000** bonds, power plant. CD 11/12—ENR 11/27.

Ky., Bowling Green—Warren Co. Bd. Educ., South Warren High School. **$250,000.**

Minn., Albert Lea—Bd. Educ. J. J. Halverson, supt., school. **$300,000.**

Minn., Anoka—Anoka Co., E. A. Carlson, aud. and City, C. R. Hohnson, clk. and mgr., defeated $400,000 bonds, combined court house and city hall, for Anoka Co. and City of Anoka. **$650,000.** Toltz, King & Day, 1509 Pioneer Bldg., St. Paul, archts.

Minn., Anoka—State, Dpt. Admin., P. T. Peterson, dir. Purchases, State Capitol, St. Paul, plans by E. D. Corwin, 813 Guardian Bldg., St. Paul, men's bldg., at State Hospital. **$205,000.**

●**Minn., Mankato**—City, Bd. Educ., Loretta M. Veigel, clk., $670,000 bond election Jan. 12, school. **$1,200,000.** Pass & Rockey, Mankato, archts. CD 12/2—ENR 12/11.

Minn., Marshall—City, Bd. Educ., P. S. Wilson, supt., school and school addns. **$600,000.** Pass & Rockey, Mankato, archts. CD 4/17/46—ENR 7/4/46.

Minn., Minneota—Village, Bd. Educ. W. K. Evans, clk., plans by Pass & Rockey, Mankato, school. **$250,000.** CD 1/25/45—ENR 2/8/45.

†**Minn., St. Paul**—Ninth Naval Dist., Great Lakes, Ill., 2 story, 100 x 20 ft. Naval Reserve Armory on Raspberry Island. **$300,000.**

Minn., South St. Paul—Dakota Co., R. C. Nelson, aud., Hastings, defeated $300,000 bonds, county hospital. City voted up to $250,000 bonds, Municipal-Dakota Co. Hospital or wholly municipal hospital. **$500,000.** CD 10/29—ENR 11/13.

Miss., Hattiesburg—Forrest Co. plans by Landry, Matthes, Olschner & Assocs., Hattiesburg, 125-bed hospital. **$350,000.** CD 11/26—ENR 12/11.

Mo., Brookfield—Linn Co., c/o Presiding Judge County Court, Linneus, defeated bonds, concrete, brick, stone hospital. **$600,000.** Project postponed indefinitely. (**Correction**—status) CD 11/26—ENR 12/11.

Mo., Marshall — Saline Co. Hospital Bd., W. B. Huff, chn., Marshall, plans by Gentry & Voscamp, 4 W. 13 St., Kansas City, Mo., rein.-con., brick 60-bed hospital. **$300,000.**

N. J., Kearny—Bd. Educ., Town Hall, plans by Lawrence C. Licht, 19 Knickerbocker Rd., Englewood, Lincoln School Gymnasium, Kearny and Midland Aves. **$200,000.** CD 10/22—ENR 11/11.

N. J., Laurence Harbor—Bd. Educ., Town Hall, 9 room school. **$300,000.**

N. J., Leonardo—Bd. Educ., Leonardo, plans by Alwyn Pierson, Woodbridge, high school. **$500,000.**

†**N. J., Woodbury**—U. S. Govt., U. S. Property & Disbursing Officer, Armory Bldg., Trenton, plans completed, 2 storage sheds. **$100,000.**

N. Y., Gouverneur — Clifton-Fine Central School Sys., Gouverneur, plans by Alvin Walter Inman, Plattsburg, central school at Star Lake. **$500,000.**

●**Okla., Oklahoma City**—University of Oklahoma, Oklahoma City, womens' dormitories. **$2,500,000.** CD 6/29/45—ENR 7/12/45.

●**Okla., Oklahoma City**—University of Oklahoma, Oklahoma City, research and classroom bldgs. **$2,500,000.**

Ore., Albany—School Bd., Albany, plans by G. Stanton, Concord Bldg., Portland, school. **$450,000.** CD 5/28/46.

Ore., Roseburg — Douglas Co., Courthouse, hospital. **$500,000.**

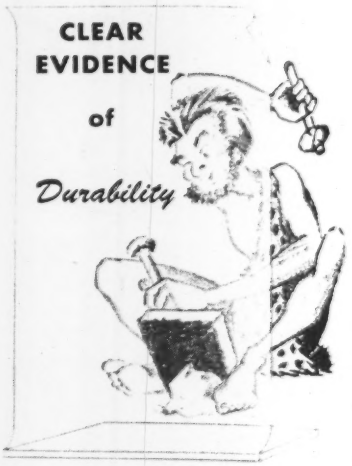
Pa., Clarks Summit—Dpt. Property & Supplies, Harrisburg, replacing boiler plant and facilities at Clark Summit State Hospital. **$644,875.** A. F. Jones, c/o owner, ch. engr.

Pa., Cornwells Heights — Bensalem Twp. School Dist., plans by H. F. Everett & Assoc., consult. engrs. and archts., 512 Hamilton St., Allentown, high school. **$450,000.** CD 9/5/45—ENR 9/20/45.

●**Pa., Polk**—Dpt. Property & Supplies, Harrisburg, hospital at Polk State School. **$1,000,000.** A. F. Jones, c/o owner, ch. engr.

Pa., Spring City—Dpt. Property & Supplies, Harrisburg, replacing boiler plant and facilities at Pennhurst State School. **$760,420.** A. F. Jones, c/o owner, ch. engr.

●**Pa., Torrance**—Dpt. Property & Supplies, Harrisburg, plans by Sorber & Hoone, 711 1st Natl. Bank Bldg., Greensburg, 2 and 3 story, 100 x 304 ft., brick, steel Torrance State Hospital addn. **$3,125,000.** CD 9/9—ENR 9/18.



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PUBLIC BLDGS. (Proposed Work, Cont'd.)

●**Pa., Warren** — Dpt. Property & Supplies, Harrisburg, women's bldg. **$500,000** admission bldg. **$1,747,500,** at Warren State Hospital. A. F. Jones, c/o owner, ch. engr.

●**Pa., Woodville**—Dpt. Property & Supplies, Harrisburg, admission bldg. at Woodville State Hospital. **$1,747,500.** A. F. Jones, c/o owner, ch. engr.

Tenn., Cookeville—City plans by Charles H. McCauley, Jackson Bldg., Birmingham, Ala., hospital. **$375,000.** CD 11/29/45—ENR 1/30/46.

Tex., Dallas—Bd. Educ., Akard and Royal Sts., plans by Mark Lemmon, consult. archt., Tower Petroleum Bldg., masonry Forest Ave. Junior High School addn. **$400,000.** CD 12/13/45.

Tex., Hemphill — Sabine Co., c/o Judge, Courthouse Bldg., hospital. **$250,000.**

●**Tex., Houston** — University of Texas, c/o Craig F. Cullinan, Austin, plans by Lamar Q. Cato, 2103, Crawford St., 3 story, masonry administration bldg. **$1,500,000.** CD 10/30—ENR 11/13.

Tex., Kountze—Hardin Co., voted $300,000 bonds 50-bed hospital. **$450,000.** Consolidated Architects & Engineers, Fort Worth Natl. Bank Bldg., Fort Worth, engrs. and archts. CD 11/26.

Tex., Rosebud—Rosebud Independent School Dist., Rosebud, voted bonds, school. **$250,000.**

Wash., Manette—School Bd., Bremerton, plans by W. Mallis, Lyon Bldg., 3 and James Sts., Seattle, Zone 4, school. **$280,300.**

N. S., Halifax—Municipality, Roman Catholic Senior High School. **$900,000.** CD 9/13/44—ENR 9/21/44.

Ont., Goderich—Town, S. H. Blake, clk. plans by C. Gillin, 284 Dundas St., London, school. **$325,000.** CD 11/10—ENR 11/29.

Ont., Peterborough—Sister of St. Joseph, J. R. Corkery, chn., 414 Water St., plans by E. J. Turcotte, 1010 St. Catherine St. W., Montreal, 4 story, 42 x 130 ft., rein.-con., frame, slab, brick, stone hospital exten., Roger St. Approx. **$400,000.** Kearns & Bromley, 1414 Drummond St., Montreal, engrs.

Ont., Renfrew—Central Mortgage & Housing Corp., 159 Bay St., Toronto, 50 addnl. houses. Approx. **$335,000.** A. J. Smith, c/o owner, engr.

Que., Ayler East—Town and Central Mortgage & Housing Corp., No. 4 Temporary Bldg., Ottawa, Ont., 10 houses on Wychwood Rd. Approx. **$550,000.**

●**Que., Quebec City** — Central Mortgage & Housing Corp., 1015 St. Alexander St., Montreal, 200 houses, St. Albert le Grand. Approx. **$1,750,000.**

Sask., Regina—Municipality, Scott Collegiate addn. **$300,000.**

COMMERCIAL BUILDINGS

PROPOSED WORK

●**Conn., Bridgeport** — Homesites, Inc., W. J. Shaughnessy, pres., 333 Nutmeg Rd., plans by Fletcher Thompson, Inc., 211 State St., 240 unit, brick, garden type apartments, Virginia Ave., Beardsley Park. **$1,500,000.**

Md., Baltimore—St. Angela's Roman Catholic Church, Rev. I. M. Cartwright, 1527 Potomac Ave., Halethorpe, plans by Hall, Border & Donaldson, 211 N. Charles St., 2 story, brick, school and auditorium, Wilkens Ave., Kensington Sect. **$300,000.** Crout, Snyder & Crandall, 20 E. Lexington St., structural engr. W. G. Robertson Jr., 325 Turnbridge Rd., mechanical engr.

N. J., Roselle—James Matthews & Herman Hoffman, c/o Gustave Iser, archt., 109 E. 29 St., New York, N. Y., garden apartment known as Oak Tree Village. **$750,000.**

●**Wis., Milwaukee**—S. Taxman & Assoc., 229 E. Wisconsin Ave., Zone 2, 100 two story apartments. **$10,000,000.**

Que., St. Anne De Bellevue—St. Georges College, St. Anne De Bellevue, plans completed by P. Lemieux, 760 Victoria Square, Montreal, 3 story, 24 x 66 ft., concrete block, brick bldg. exten., concrete fdns. Approx. **$275,000.**

Que., Verdun—Parish of Notre Dame de la Paix, Rev. J. A. Garvis, cure, 3445 La Salle Blvd., Verdun, plans by Ludgar & Lamieux, 760 Victoria Square, Montreal, church, Strathmore Ave., near LaSalle Blvd. Approx. **$250,000.**

INDUSTRIAL BUILDINGS

PROPOSED WORK

Mont., Billings — PLANT — Eaton Metal Products Co., Billings, 60 x 100 ft. plant for tank fabrication, 85 x 100 ft. bldg. for culvert fabrication. **$100,000.**

Mont., Billings — OIL REFINERY — North Star Refining Co., Billings, oil refinery. **$250,000.**

N. J., Elizabeth — WAREHOUSE — Sears, Roebuck & Co., 4640 Roosevelt Blvd., Phila., Pa., plans by Ballinger Co., 105 S. 12 St., Phila., Pa., 1 story warehouse, Jefferson Ave. and Anna St. **$600,000.**

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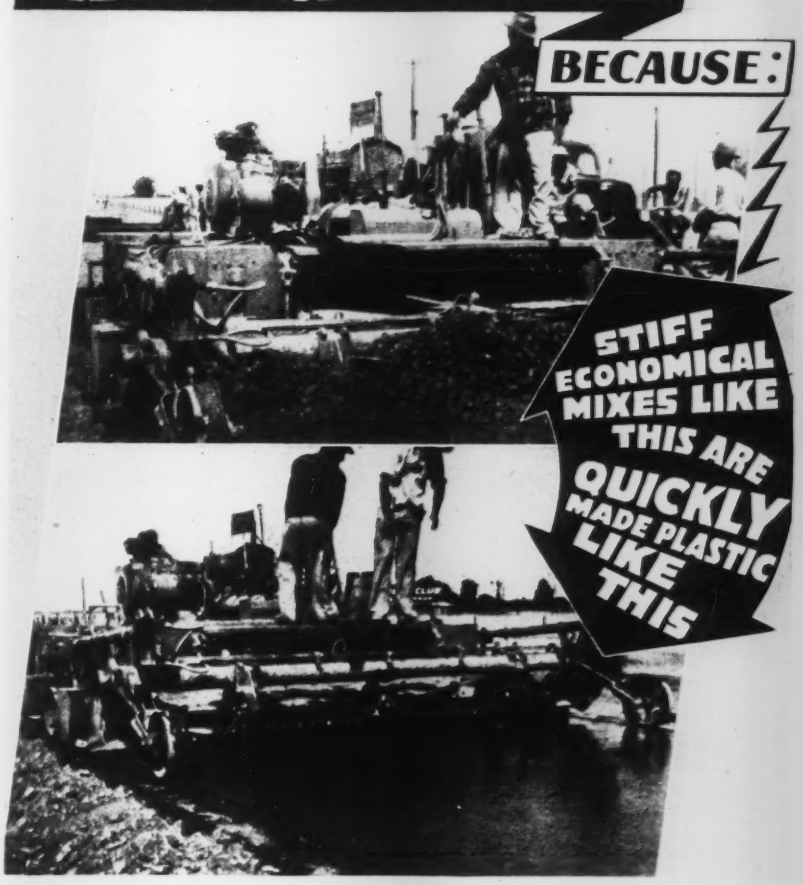

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The JACKSON Paving Tube is perfectly adaptable to slabs 6" to 24" thick, without affecting the efficiency on single or two-course standard plain or reinforced concrete pavement construction and may be quickly adjusted from 10' to 25' widths in the field. Power Plant mounted on the Finisher has ample reserve power through entire frequency range of 3000 to 5000 VPM. Finger tip controls. Quickly and easily attached to any standard finisher — and can be attached to the rear of standard spreaders to advantage for vibrating the first course in thick slab construction. One of the best investments in equipment a paving contractor can make. See your Jackson distributor or write for further information NOW.

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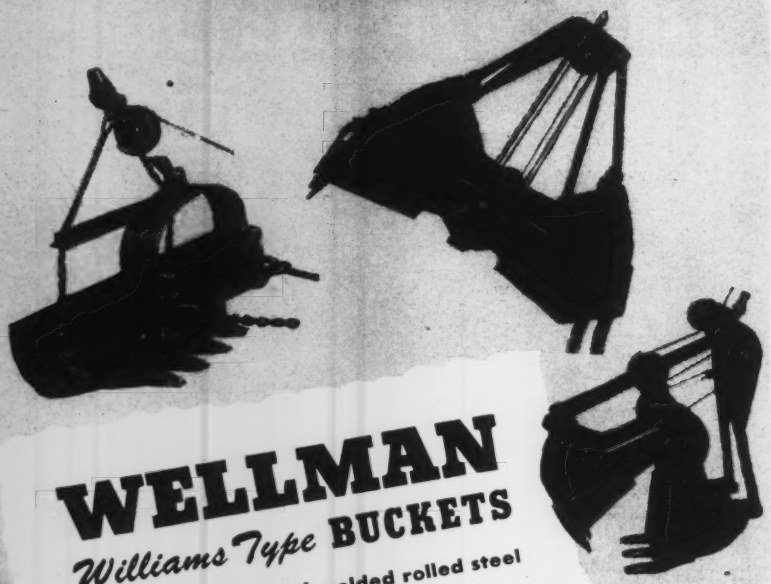

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THE WELLMAN ENGINEERING COMPANY

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INDUSTRIAL BLDGS. (Propos... Work. Cont'd.)

N. J., Plainfield—FACTORY—M... Bronson Bldg., 1 story factory, ... North Aves. **$150,000.**

N. J., Trenton—SALES and SER... TION—D. H. Volk, 29 Pashley ... by Louis Cajdan, 25 N. Montgome... and service station, incl. tire reca... ice, S. Stockton St. **$150,000.** CD ... ENR 10/17/47.

N. Y., Brooklyn—FACTORY, ... L. Nogel, 377 Dean St., Zone 17, ... Lama & Proskauer, 383 Pearl St., ... 2 story factory, stores, bar, and ... alleys, 371-87 Dean St. **$200,000.**

N. Y., Cheektowaga—PLANT—... Rapp Co., 212 Winchester Ave., pla... en Rd. **$165,000.**

N. Y., New York—TERMINAL ... Park Development Co., Sayles... Raymond Irrera, 29-18 41 Ave., L... City, trucking terminal and office... Greenwich St. **$100,000.**

N. Y., New York—PLANT—The ... Journal of Commerce, 63 Park Row, ... plans by William Ginsberg Assoc., ... son Ave., Zone 17, newspaper publishing ... 99 Worth St. Over **$500,000.**

N. Y., New York—GARAGE—... Development Corp., 4 E. 46 St., ... plans by George G. Miller, 67 W. 44 St., ... Zone 18, 4 story garage 216-224 W. 58 St. ... **$300,000.**

N. C., Charlotte—WAREHOUSE—... Witmer, Inc., 513-A Tryon St., 8,500 sq. ft. ... floor space warehouse. **$100,000.**

O., Cleveland—PLANT—Coca Cola ... Works, 1562 Abbey Rd., brick, steel, concrete ... bottling plant, Woodhill Rd. and Woodhill ... Ave.

●**O., Columbus** — BAKING PLANT — ... Inc., 1910 Harney St., Omaha, Neb., ... Tassie, mgr., Columbus Div., 391 E. Moler St., ... enlarging baking plant, 391 E. Moler St., and ... remodeling present quarters. **$1,250,000** ... equip. Dan A. Carmichael, 5 E. Long St., ... archt.

Pa., Indiana — WAREHOUSE — ... Tire & Rubber Co., Indiana, plans by Frank... lin, Douden & Assoc., 522 Century Bldg., ... Pittsburgh, 1 story, 125 x 162 ft., brick ... steel frame warehouse. **$800,000.** CD 2/27/46 ... —ENR 4/4/46.

Pa., Pittsburgh — BAKERY — Andrew W... Mellon Estates, Mellon Natl. Bank trees., con... steel bakery and food processing bldg., 25 ... and Smallman Sts. **$700,000.** A. & P. Food ... Stores, 420 Lexington Ave., New York, N. Y., ... lessee.

R. I., Cranston—FACTORY—T. A. Mona... han, Wellington Ave., plans by Oliver G. ... Gauvin, 72 Weybosset St., Providence, 1 ... story, 200 x 250 ft. brick, steel, cinder block ... factory, Wellington Ave. **$125,000.**

S. C., Anderson—PLANT—Anderson Indus... trial Buildings Corp., Anderson, textile plant ... **$140,000.**

●**S. C., Columbia**—WAREHOUSE—Colonial ... Stores, Inc., 321 Dunmore St., Norfolk, Va., ... plans by William G. Burnsnall, Norfolk, Va., ... food storage warehouse. **$1,250,000.** CD 4/1 ... —ENR 4/10.

Tenn., Shelbyville — PLANT — Economaster ... Products, Inc., Shelbyville, rebuilding mfg. ... plant. **$100,000.**

Tex., Amelia (Beaumont P. O.)—LABORA... TORY, etc.—Sun Oil Co., Beaumont, 2 story ... T shaped, brick, steel frame laboratory, shop, ... office, concrete pier and beam fdn. **$325,000.**

Tex., Beaumont—PLANT—Bethlehem Steel ... Co., Beaumont, ship-building plant expans. ... **$500,000.**

Tex., Dallas—GENERATING PLANT—Dal... las Power & Light Co., Dallas Power & ... Light Bldg., addnl. generating plant unit, ... Griffin St. **$650,000.**

Tex., Dallas—PLANT—Peter Paul, Inc., ... Naugatuck, Wis., altering, expanding masonry ... plant, 6100 Blk. Denton Dr., **$80,000**; masonry ... candy mfg. plant, 3 acre tract **$500,000.**

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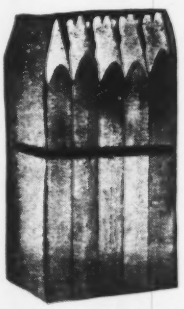

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	Per 100	In 5000 lots Per 100
1x2—12"	$5.05	$4.60
1x2—15"	5.15	4.65
1x2—18"	5.25	4.75
1x2—24"	6.20	5.65
1x2—36"	8.80	8.00
2x2—12"	$6.50	$5.90
2x2—15"	8.15	7.00
2x2—18"	8.70	7.90
2x2—24"	10.45	9.50
2x2—36"	15.00	13.65

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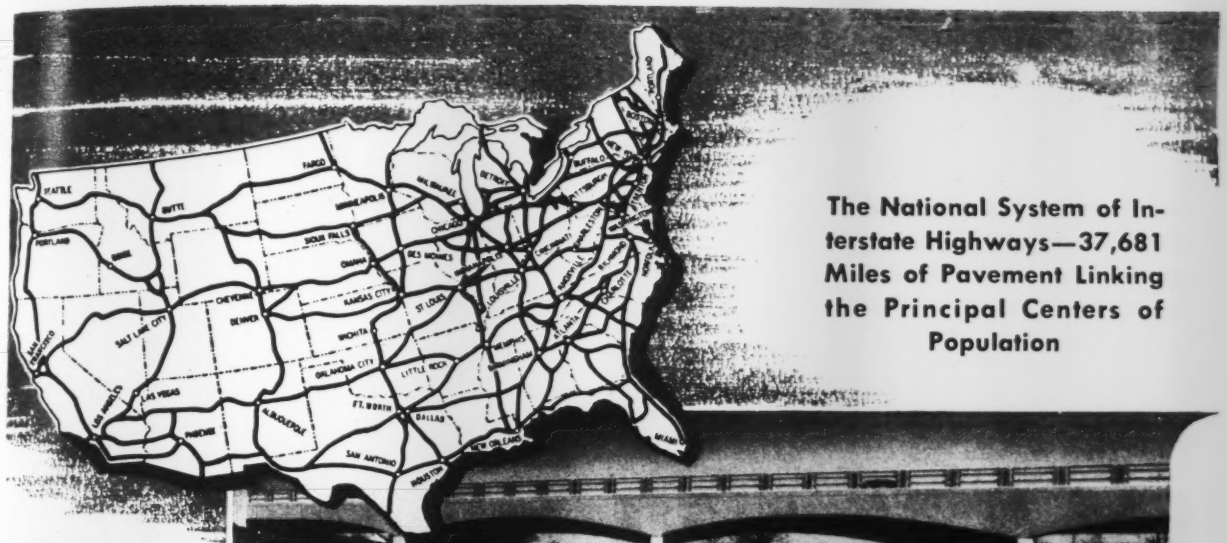

The National System of Interstate Highways—37,681 Miles of Pavement Linking the Principal Centers of Population

Map above shows National System of Interstate Highways selected by joint action of state highway departments and approved by the Public Roads Administration.

●

A section of the Detroit Industrial Expressway—an integral part of the Interstate System. Four-lane divided highways are recommended where peak hourly traffic exceeds 800 vehicles.

Ever-growing Traffic Demands Long-lasting CONCRETE PAVEMENT

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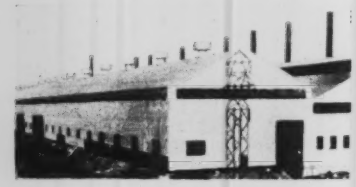

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INDUSTRIAL BLDGS. (Proposed Work, Cont'd.)

●**Tex., Dallas**—FREIGHT TERMINAL—Texas & Pacific Ry. Co., R. J. Gammie, ch. engr., Texas & Pacific Bldg., plans by Wyatt C. Hedrick, consult. engr. and archt., 904 Fort Worth Ave., 2 story, stone, steel freight terminal, **$850,000**; motor transport garage servicing trucks, **$275,000**, in Industrial area on 40 acre site. CD 9/13/46—ENR 10/3/46.

Tex., Dallas — WAREHOUSE, etc. — Texas Co., 2310 S. Lamar St., masonry, steel warehouse, storage and repair garage, Singleton Blvd. **$100,000.**

Tex., Dallas—WAREHOUSE—Western Auto Stores, 703 McKinney St., masonry warehouse. **$225,000.**

Tex., Dallas—PLANT—Western Electric Co., 4801 Lemmon St., 3 story, rein.-con., brick distributing center plant, pier and beam fdn., 819 Transit St. **$535,000.** H. K. C. Lawson, c/o owner, archt.

●**Tex., Garland** — PLANT — Champion Spark Plug Co., 900 Upton St., Toledo, O., spark plug mfg. plant. **$1,500,000.**

Tex., Grand Prairie—PLANT—Texas Engineering & Mfg. Co., Grand Prairie, plant expan. **$100,000.**

Tex., Houston—PLANT—Kistler's Radar Sandwiches of Texas, c/o Albert S. Golemon, 915 Woodruff St., plans by A. S. Golemon & Rolfe, 915 Woodruff St., Houston, and H. Golemon, Beaumont, masonry food mfg. plant. **$125,000.**

Tex., Houston—PLANT—Standard Rendering Co., Sam H. Ray, mgr., 635 Adams St., Kansas City, Mo., expanding rendering plant. **$325,000.**

●**Tex., Levelland**—PLANT—Stanolind Oil & Gas Co., Gulf Bldg., Houston, natural gasoline plant. **$3,000,000.**

Tex., McGregor—FACTORY—Western Stove Co., c/o H. Honer, pres., Waco, stove factory. **$500,000.**

Tex., Pasadena—PLANT—Crown Central Petroleum Corp., Union National Bank Bldg., Houston, gasoline refinery plant imprvs. **$250,000.**

Tex., San Antonio—WAREHOUSE—E. A. Basse, Jr., c/o archt., plans by Ralph H. Cameron, 1701 Transit Tower, masonry warehouse. **$275,000.**

Tex., Texas City—REFINERY—Petrol Terminal Corp., Texas City, addnl. refinery expan., incl. distillation unit with 30,000 bbl. crude topping capacity. **$150,000.**

●**Utah, Salt Lake City**—REFINERY—Utah Oil Refining Co., P. O. Box 898, oil refinery expans. **$2,500,000.**

Wash., Spokane — WAREHOUSE — Grinnell Co. of the Pacific, Elliott Ave. and Bay St., Seattle, 1 story, 140x180 ft., brick plumbing supply warehouse. **$200,000.**

Wash., Vancouver—PLANT—Aluminum Co. of America, Gulf Bldg., Pittsburgh 19, Pa., aluminum fabrication plant. Over **$500,000.**

Alta., Calgary—PLANT—Dr. J. M. Stein, 1704 Sunset Blvd., Hollywood, Calif., U. S. A., plant. Approx. **$100,000.**

●**Alta., East Calgary**—REFINERY—McColl Frontenac Ltd., Notre Dame St. E., Montreal East, oil refinery on 60 acre site. **$1,000,000.**

B. C., Duncan Bay (Postal Dist. Campbell River)—PLANT—Syndicate, c/o Hon. M. Kenney, Minister of Lands, Victoria, wood pulp plant. **$100,000.**

Man., Winnipegasies—KAOLIN DEVELOPMENT—Norman S. Black, 1185 McMillan Ave., Winnipeg, developing kaolin deposits, constructing plant. **$100,000.**

●**N. B. Hillsboro**—PLANT—Atlantic Chemicals Co. Ltd., Senator F. W. Pirie, pres., Grand Falls, plant. Approx. **$4,000,000.**

●**Ont., Hamilton** — FURNACE — Dominion Foundries & Steel Ltd., F. A. Sherman, pres., Depew St., blast furnace and coke oven plant. Approx. **$15,000,000.**

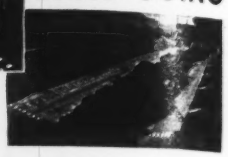
Ont., Leaside—PLANT—Standard Chemical Co. Ltd., 195 Fleet St. E., Toronto, plans by Meadows & Critoph & Co., 118 Richmond St. W., Toronto, plant alterations, 99 Vanderhoof Ave. Approx. **$100,000.**

Ont., Toronto—PLANT—S. A. Armstrong Ltd., 115 Dupont St., plans by Parrott, Tambing & Witmer, 57 Bloor St. W., (1st unit) 60 x 120 ft. plant (with total project 120 x 180 ft.) 60 x 90 ft. office, both brick, steel, concrete fdns., Yardley and O'Conner Dr., East York Twp. Approx. **$100,000.**

●**Ont., Whitby**—PLANT—Dunlap Tire & Rubber Co. Ltd., 870 Queen St. E., Toronto, plant, near highway, adjacent to Canadian National Railroad spur line. Approx. **$1,500,000.**

Ont., Windsor—PLANT—Ford Motor Co. of Canada Ltd., 2780 Sandwich St. E., 1 story, 160 x 225 ft., concrete, steel, brick, stock receiving plant, Franklin and Cadillac Sts. Approx. **$250,000.** CD 2/21/45.

●**Que., Bryson** — GENERATOR — Gatineau Power Co. Ltd., 140 Wellington St., Ottawa, Ont., 27,000 hp. generator at plant, to supplement 24,000 hp. installed at Farmers Rapids. Approx. **$1,000,000.**



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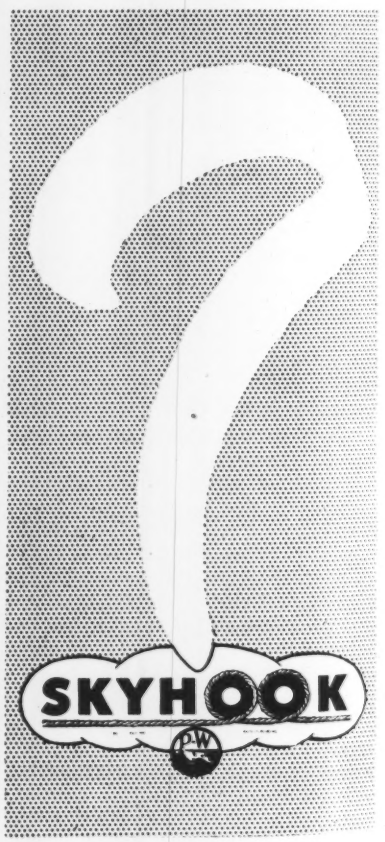

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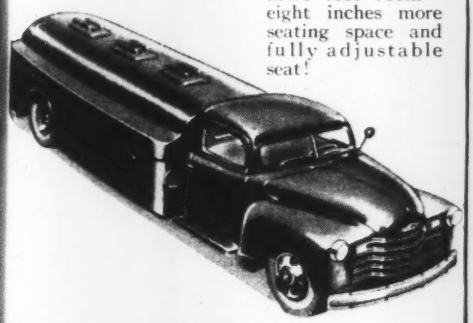

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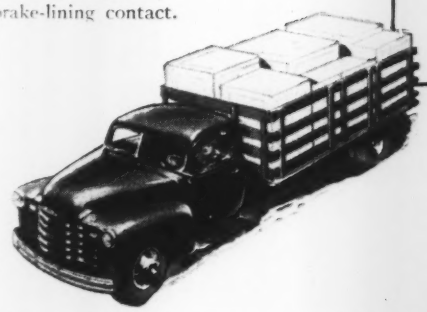

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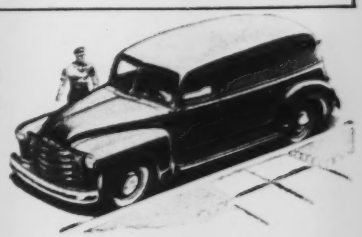

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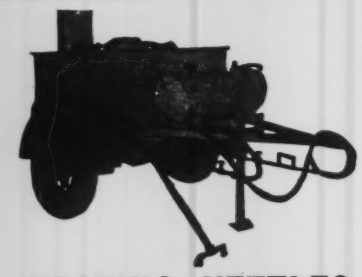

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INDUSTRIAL BLDGS. (Proposed Work Cont'd.)

Que., Montreal—PLANT—Industrie Du Messager, 4239 Bordeaux St., ... ing plant, 2 or 3 separate bldgs. Approx. ... 50,000.

●**Que., Montreal**—PLANT—Stan... Chemical Co., Ltd., 195 Fleet St. E., ... chlorine-caustic soda plant. N... Approx. **$2,000,000.** W. N. Ha... Dame St. engr. CD 1/30—ENR 2/20, und... owner.

●**Que., Quebec City**—PLANT—K... Sarna, per Corp., 120 Broadway, New ... Secott Cop... U.S.A., smelter plant at locat... York, N. Y., shore of St. Lawrence River ... on north mi. below here. Approx. $2,0... Approx. $60...

Que., St. Marie De Beauce—... PLANT—Cur... Pathe, Ltd., St. Marie De B... ive, recon... structing plant. Approx. **$200,000.**

UNCLASSIFIED

PROPOSED WORK

Alabama—RURAL DISTRIBUTION LINES—Joe Wheeler Electric Membership Corp., Hartselle, completing previous construction sys. imprvs., and 175 mi. distr. line additions, Morgan Co. **$550,000.**

Colorado—RURAL DISTRIBUTION LINES—Y-W Electric Assn., Yuma, 200 mi. rural distr. lines, Yuma Co. **$209,000.** W. H. Horwin, Box 88, Fredonia, Kan., engr. CD 11/24—ENR 12/11.

Georgia—RURAL DISTRIBUTION LINES—Coweta-Fayette Electric Membership Corp., Newman, 231 mi. rural distr. lines and completing previously approved construction, Coweta Co. **$415,000.**

Ga., Brunswick—STADIUM—City, plans by Abreu & Robeson, 22 Marietta St., Bldg., Atlanta, football stadium. **$300,000.** CD 12/17.

Idaho — RURAL DISTRIBUTION LINES—Clearwater Valley Light & Power Assn., Lewiston, 264 mi. rural distr. lines, Nez Perce Co. **$264,000.** R. S. Dale, c/o owner, engr. CD 11/24/44—ENR 12/14/44.

Ill., Herrin — GYMNASIUM — Herrin High School Dist., c/o Bd. Educ., E. L. Eckert, secy., Herrin, plans by L. Hagerman, Evansville, Ind., concrete bowl-type gymnasium for Herrin High School. **$200,000.** CD 12/17.

Indiana—RURAL DISTRIBUTION LINES—Orange County Electric Membership Corp., Orleans, sys. imprvs., completing previously approved construction and 157 mi. distr. lines, Orange Co. **$390,000.** CD 9/9/46—ENR 9/19/46.

●**Iowa**—RURAL DISTRIBUTION LINES, etc.—Cornbelt Power Co-operative, Humboldt, 310 mi. rural distr. lines, Hamilton Co., 1,500 kw. steam generating plant at Humboldt, **$5,300,000.**

Iowa—RURAL DISTRIBUTION LINES, etc.—Southern Iowa Electric Co-operative, Bloomfield, completing previously approved construction, and one 740 kw. generating unit, Davis Co. **$255,000.**

Kansas—RURAL DISTRIBUTION LINES—Arkansas Valley Electric Co-operative Assn., Hutchinson, rural distr. lines, Reno, Rice, Harvey and Kingman Counties, **$140,000.** F. H. Kilburn, 28 E. Sherman St., Hutchinson, engr. CD 5/16—ENR 5/29.

Kan., Atchison—SWIMMING POOLS—City, 2 swimming pools. **$174,000.** K. H. Lacklen & Assocs., Wirthman Bldg., Kansas City, Mo., consult. engrs. CD 4/17—ENR 5/1.

Kentucky—RURAL DISTRIBUTION LINES—Taylor County Rural Electric Co-operative Corp., Campbellsville, sys. imprvs., headquarters facilities, 120 mi. rural distr. lines, Taylor Co. **$560,000.** CD 4/26/46—ENR 5/16/46.

Michigan—RURAL DISTRIBUTION LINES—Presque Isle Electric Co-operative Assn., Onaway, installing two 1,100 kw and one 220 kw generating units, constructing 84 mi. rural distr. lines, Presque Isle Co. **$930,000.** CD 9/26/46—ENR 10/17/46.

Minnesota—RURAL DISTRIBUTION LINES—Crow Wing Co-operative Power & Light Co., Brainerd, sys. imprvs., 149 mi. rural distr. lines, etc., Crow Wing Co. **$550,000.** CD 9/18/46—ENR 10/3/46.

Minnesota—RURAL DISTRIBUTION LINES—Dairyland Electric Co-operative, Grand Rapids, 283 mi. rural distr. lines, Itasca Co. **$445,000.** CD 6/23—ENR 7/10.

Minnesota—RURAL DISTRIBUTION LINES—Douglas County Co-operative Light & Power Assn., Alexandria, sys. imprvs. and 313 mi. rural distr. lines, Douglas Co. **$545,000.**

Minnesota—RURAL DISTRIBUTION LINES—Itasca-Mantrap Co-operative Electric Assn., Park Rapids, D. Husby, mgr., imprv. rural distr. lines, Hubbard Co. **$390,000.** Rapids Eng. Co., 1549 University Ave., St. Paul, consult. engr.

Missouri—RURAL DISTRIBUTION LINES—Consolidated Electric Co-operative, Mexico, 331 mi. rural distr. lines, completing previously approved construction, Audrain Co. **$565,000.**

Missouri—RURAL DISTRIBUTION LINES—Laclede Electric Co-operative, Lebanon, sys. imprvs., 16 mi. rural distr. lines, completing previously approved construction, and 1... mi. rural distr. lines, Laclede Co. $593,000.

Missouri — RURAL DISTRIBUTION LINES—Macon Co-operative, Macon, sys. imprvs. and additional lines, Macon Co., and vicinity, **$455,000.**

UNCLASSIFIED (Proposed Work, Cont'd.)

Neb., Omaha—STADIUM—Omaha University, 61 and Dodge Sts., plans by John Latenser & Sons, 1307 Farnam Sts., stadium. **$500,000.**

•N. J., Elizabeth—FREIGHT YARD—Central R. R. of New Jersey, A. M. Zabriskie, ch. engr., foot of Johnson Ave., Jersey City, freight yard, south of proposed Route 100. **$10,000,000.**

New Mexico — RURAL DISTRIBUTION LINES—Columbus Electric Co-operative, Columbus, 70 mi. rural distr. lines, Luna Co. **$150,000.**

N. Y., Brooklyn — RECREATION CENTER—Dpt. Parks, Arsenal Bldg., New York, N. Y., plans by Eggers & Higgins, 342 Fifth Ave., New York, Zone 19, 2 story recreation center, 740-830 Lorimer St. **$575,000.** CD 4/5/46—ENR 4/18/46.

Ohio—RURAL DISTRIBUTION LINES—Inter-County Rural Electric Co-operative, Hillsboro, 115 mi. rural distr. lines, Pike Co. **$215,000.** CD 11/22/44—ENR 12/14/44.

Ohio — RURAL DISTRIBUTION LINES—Pioneer Rural Electric Co-operative, Piqua, sys. imprvs. and 26 mi. rural distr. lines, Miami Co. **$240,000.** CD 8/23/46—ENR 9/5/46.

Oklahoma—CRUDE OIL PIPELINES—Sunray Oil Corp., Philtower Bldg., Tulsa, approx. 60 mi. addnl. crude oil pipelines to run ore from major lines to refinery at Duncan, **$200,000**; 25 mi. 8 in. pipeline between Texas Co. pipeline at Velma and Duncan, **$190,000.**

Pa., Harrisburg—SWIMMING POOL, etc.—City, plans by Frederick E. Loescher, 2209 N. Field Rd., Bellevue Park, Harrisburg, swimming pool and bathhouse. **$200,000.** R. M. Andrews, city engr. CD 5/9/44—ENR 5/18/44.

S. C., Myrtle Beach—GOLF COURSE—The Dunes Golf & Beach Club, Myrtle Beach, Fla., 18-hole golf course. **$200,000.** Robert Trent Jones, 20 Vesey St., New York, N. Y., consult. engr. CD 12/9—ENR 12/18.

Texas—RURAL DISTRIBUTION LINES—Deep East Texas Electric Co-operative, San Augustine, rural distr. lines, San Augustine Co. **$350,000.**

Texas—RURAL DISTRIBUTION LINES—Farmers Electric Co-operative, Greenville, addnl. rural distr. lines, Hunt Co. **$432,000.**

Texas—RURAL DISTRIBUTION LINES—Grayson-Collin Electric Co-operative, Van Alystine, 120 mi. rural distr. lines and sys. imprvs., Grayson and Collin Counties **$170,000.**

Texas—RURAL DISTRIBUTION LINES—Greenbelt Electric Co-operative, Wellington, 350 mi. rural distr. lines, Collingsworth Co. **$408,000.**

Texas—RURAL DISTRIBUTION LINES—Hall County Electric Co-operative, Memphis, 128 mi. rural distr. lines, Hall Co. **$150,000.**

Texas—RURAL DISTRIBUTION LINES—Lamb County Electric Co-operative, Littlefield, rural distr. lines, Lamb Co. **$210,000.**

Tex., Bay City—GAS SYSTEM—Bay City Gas Co., Bay City, municipal gas sys. imprvs., extens. **$250,000.**

Tex., Bay City—LIGHTING SYSTEM—Central Power & Light Co., Bay City, White Way street lighting sys. **$100,000.**

Tex., Dallas — SWIMMING POOL — City, Lake Cliff Swimming Pool, remodeling deep pool into diving pool, shallow pool into 2 75 x 200 ft. and 3 ft. to 5 ft. deep concrete pools, constructing circular pool for children. **$350,000.** L. B. Houston, city engr.

Tex., El Paso—STADIUM AND FIELD HOUSE—El Paso Independent School Dist., El Paso, plans by Carroll & Daeuble, 355 1st Natl. Bank Bldg. stadium and field house. **$500,000.** Herbert C. Hare, 114 W. 10 St., Kansas City, Mo. landscaping engr. J. S. Cope, El Paso, designing engr. CD 10/22—ENR 11/13.

Tex., Highland Park—SWIMMING POOL—City, enlarging swimming pool to 130x165 ft., constructing 2 concrete wading pools, bathhouse, filtration sys. etc. **$125,000.** Jack Kirven, city engr.

Utah — POWER TRANSMISSION LINE — Telluride Power Co., H. B. Waters, pres. and ch. engr., Walker Bank Bldg., Salt Lake City, power transmission line in Sevier Co. and reinforcing present power lines in Millard Co., also misc. imprvs. to power sys. **$500,000.**

Wash., Bellingham — SWIMMING POOL — City, City Hall, defeated bonds swimming pool. **$100,000.** E. W. Gooch, city engr. CD 10/17—ENR 10/30.

Wash., Longview — PIER, etc. — Port of Longview, repair piling structure of pier and rebuild portions of warehouse. **$175,000.**

Newfoundland, St. John's—WHARVES, etc.—Govt. of Newfoundland, St. John's, wharves and breakwater. Approx. **$500,000** appropriated. Dpt. P. Wks., St. John's, engr.

Ont., Cobourg — ICE RINK — Municipality, artificial ice rink. **$100,000.** Ratepayers to vote Dec. 8. CD 11/20/45—ENR 12/13/45.

•Quebec—HYDRO-ELECTRIC POWER DEVELOPMENT—Beauharnois Light, Heat & Power Co., Valleyfield, 600,000 hp. hydro-electric development on St. Lawrence River, between Lake St. Francis and Lake St. Louis. **$40,000,000.** CD 3/17/42—ENR 3/19/47

Quebec — RAILROAD — Kennecott Copper [illegible] Broadway, New York, N. Y., U.S.A., 28 mi. railroad from Havre St. Pierre to serve smelter plant, 600 mi. below Quebec City. Approx **$800,000.**

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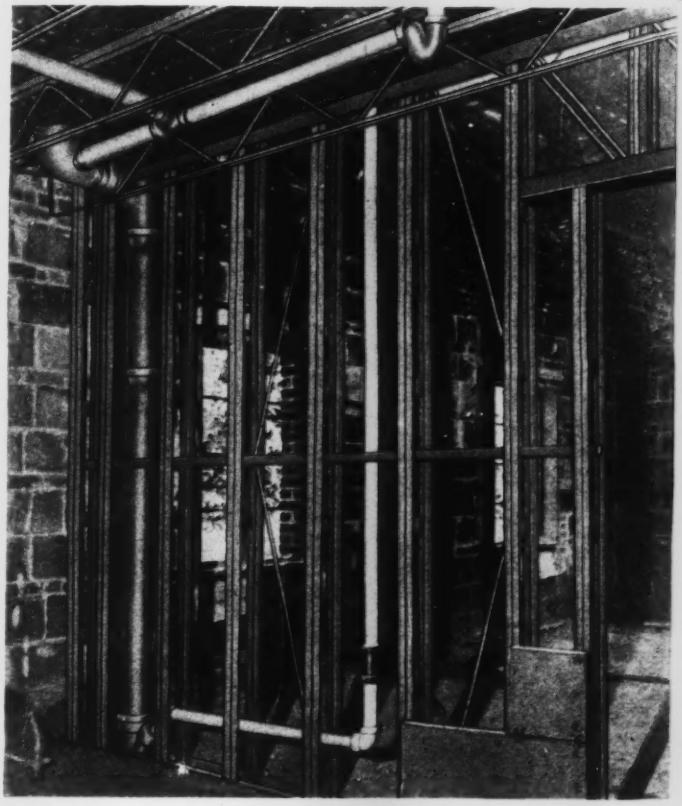

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